AUG 13 1943

The OIL AND GAS JOURNAL

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HOUSTON TEXAS

Senior Organization in Men and Management for

HUGHES AIRCRAFT STRUT DIVISION—DICKSON GUN PLANT—HUGHES AIRCRAFT COMPANY

PRICE 20 CENTS AUGUST 12, 1943

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the OIL AND GAS JOURNAL

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General Heading: **BAKER MODEL "K" CEMENT RETAINER**

BAKER OIL TOOLS, INC.
Main Office and Factory:
6000 So. Boyle Ave., Box 127, Vernon Station, Los Angeles, Calif.
Central Division Office and Factory:
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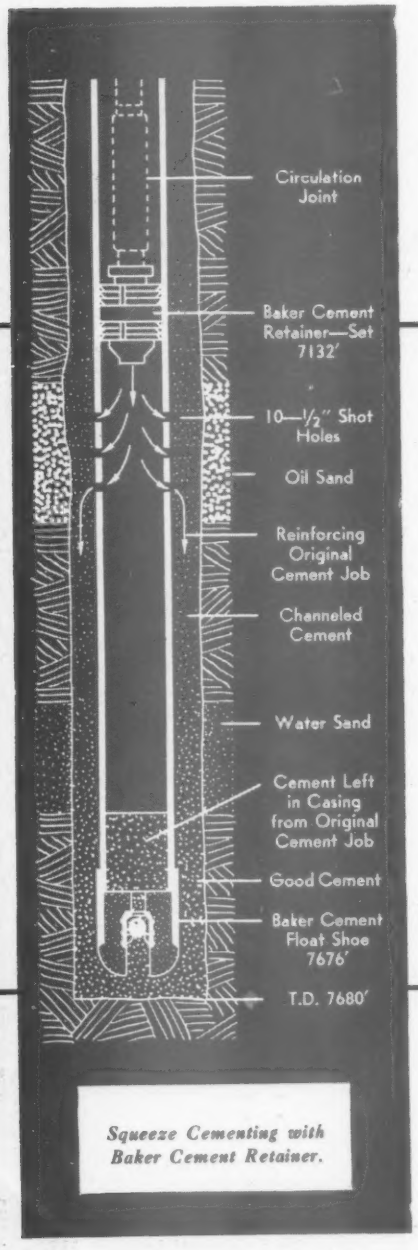
Export Sales Office:
19 Rector Street, New York, N. Y.

Unit No. **A-23**

Subject: **Squeezing to Rectify Imperfect Cement Job**

Index: 250.1
Date: August 12, 1943
Page: 1



Squeeze Cementing with Baker Cement Retainer.

If you are confronted with water problems . . . problems which may be solved through the use and proper placement of cement . . . it will pay you to investigate the Baker Model "K" Cement Retainer. This device is daily solving many of the usual and unusual cementing, well repair and well completion problems confronting the industry, and it may be the solution to YOUR difficulties.

PROBLEM: *To Shut Off Water Coming up to Gun Perforations*

METHOD: *Set Baker Cement Retainer Above Perforations and Apply Squeeze (A Cement Plug was Already in the Line Below the Perforations)*

RESULT: *After Cleaning Out, Zone was Reperforated and CLEAN OIL Produced*

• DETAILS •

Field: Montebello, Calif.
Depth of Well: 7680'
Depth Retainer Set: 7132'
Breakdown Pressure: 1800#
Final Pressure: 3000#
Number of Sax Mixed: 50
Number of Sax Put Away: 50
How Cement Discharged: Through Ten, 1/2" Shot Holes

Complete information concerning the design, construction and operation of the Baker Model "K" Cement Retainer and its many practical field applications, will be found on pages 250 to 263 of the 1942 Baker, or Composite, Catalog.

Service Note— Competent Baker men will service, make suggestions, and otherwise assist in securing best possible results.

BAKER CEMENT RETAINER

the OIL AND GAS JOURNAL

Trends

Crude-Oil Production By States — Page 88

CRUDE PRODUCTION 4,208,025 bbl. daily average—up 86,850 bbl. One year ago 3,997,155 bbl.

CRUDE STOCKS 238,420,000 bbl. as of July 31—up 1,141,000 bbl. One year ago 248,336,000 bbl.

GASOLINE STOCKS 74,977,000 bbl. as of July 31—down 737,000 bbl. One year ago 79,446,000 bbl.

RESIDUAL FUEL-OIL STOCK 66,877,000 bbl. as of July 31—down 115,000. One year ago 77,985,000 bbl.

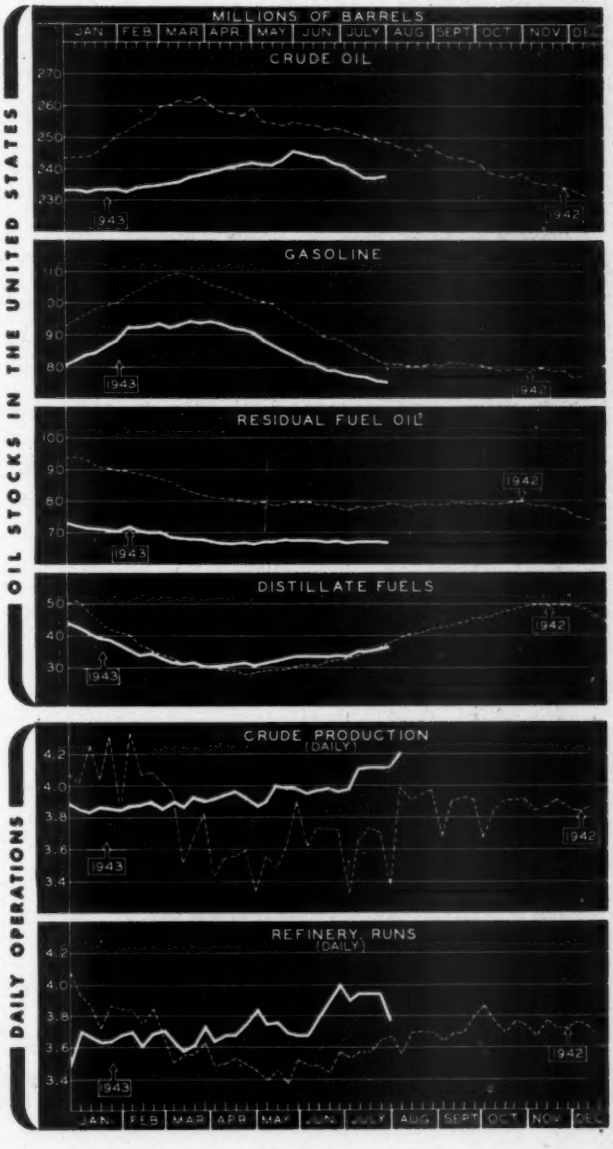
GAS OIL AND DISTILLATES 36,363,000 bbl. as of July 31—up 474,000 bbl. One year ago 37,828,000 bbl.

REFINERY RUNS 3,788,000 bbl. daily week ended July 31—down 185,000. One year ago 3,685,000 bbl.

IF the statements credited to Washington officials over the past few days materialize the petroleum industry before this week is over will have something definite in regard to the Government's future policies relative to rationing and the part that Latin America and possibly other countries are to play in the oil supplies of the Allies. While OPA has again refused the industry's and PAW's request for a 35-cent-per-barrel advance in posted crude-oil prices there are those who are confident that an appeal to higher authorities will bring favorable action in the early fall. Despite the strong opposition that has developed in the Middle West and Southwest it is believed certain that the Government shortly will equalize gasoline rationing by decreasing supplies in Districts 2 and 3 with increases in District 1.

REPORTS since the first of the month indicate that the Allied program calls for a substantial increase in crude-oil and product supplies from two or three countries to the south of the United States. The crude-oil production of six South American countries, Mexico and Trinidad averaged 964,000 bbl. daily in 1941 with a peak in excess of 1,000,000 bbl. daily. This production decreased to 737,000 bbl. in 1942 and 683,000 bbl. the first half of this year. Most of the decrease was in Venezuela, Colombia and Mexico. The other principal producing countries in South America—Peru, Argentina and Ecuador—have shown little change in output over the past 2½ years. Trinidad has maintained its production with minor changes.

AS explained in a special article in this issue the production in Venezuela and Colombia has taken a sharp upturn over the past month. In this connection a report this week shows that the production of Lago Petroleum Corp., largest of the Lake Maracaibo producing companies, increased from an average of 128,000 bbl. daily in 1942 to 218,000 bbl. daily for the first 2 weeks in July. The average for the first half of this year was 172,000 bbl. daily. This development is interpreted to mean a resumption in drilling activity in Venezuela. The reports so far have not pointed to increased outlets for Mexico although its production for the first 6 months of this year was 25 per cent less than the 1941 average. The increase in South American production is certain to be a factor in the price discussions in this country as there are those who feel that the expansion in those supplies is part of the government program to further delay needed advances in crude-oil price schedules in this country.



Operators Critical of Selected-Field Pricing Program Suggested by OPA

by H. Stanley Norman

ANOTHER formal OPA rejection of a general increase in crude-oil price ceilings caused operators this week in the Mid-Continent and southwestern states to reappraise their wartime-economic position. The audit producers made of petroleum-price developments since start of the war shows conclusively, they contend, that the oil industry has the unenviable record of being virtually alone in effectiveness of "hold the line" economic policies.

Admission by Prentiss Brown, OPA administrator, that higher prices probably would stimulate production was considered by producers as an entering wedge in their efforts to crack the economic stalemate. OPA's reservation of this incentive for areas of extreme shortage indicated, however, that arguments of oil men and certain other government agencies have not changed the basic-oil policy of the price-control bureau.

Local price rises, producers argue, do not answer the fundamental question. They consider local advances insufficient incentive for expanded exploratory activity, secondary-recovery operations, marginal drilling and remedial and rehabilitation work. The OPA admits, producers assert, the effectiveness of price incentives in correcting local crude-oil shortages. But, operators argue, the price-control agency is permitting local shortages to develop on a national scale and much more rapidly than a rise here and there can possibly offset.

Crude Prices Fall Behind

Complaints of producers are largely based on the current trends of petroleum prices in relation to other raw materials. The record for the past 16½ years, shown in the accompanying chart, reflects a reasonably constant relation between prices for crude oil and other raw materials until 1941, when petroleum markets were frozen. During the past 1½ years, the general price for crude oil has remained constant at an adjusted index level of 106.3 while raw materials have moved skyward, standing at 148.4 in May 1943, with the upward trend constantly continuing.

In a press release dated May 14, 1943, the Office of Price Administration stated:

"In line with the policy of providing individual price relief where necessary for crude-oil producers rather than making a general industry-wide increase, the Office of Price Administration reported today that in slightly more than a year it had approved higher ceiling prices in more than 40 cases to ease the hardship of local or regional producers to stimulate production of vitally needed war supplies."

With respect to the recommendation by the petroleum administrator for a general increase in crude-oil price ceilings to average 35 cents per barrel, the same press release quotes Mr. Brown as saying:

"Taking each price case on its individual merits, rather than providing a blanket increase to the whole industry, seems to be the more direct and equitable way to handle the matter."

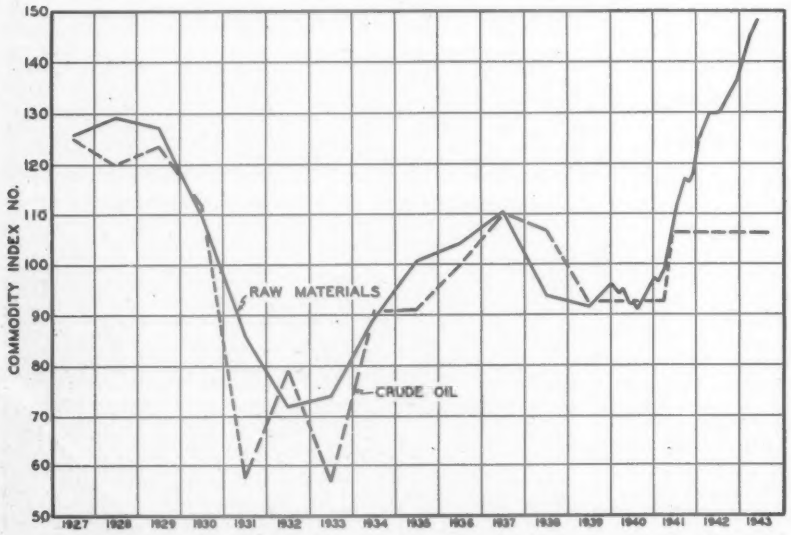
It is apparent from these statements and from other similar ones that have been issued from time to time by OPA that it has adopted a policy of attempting to meet the crude-oil price problem through local increases.

An analysis of the 58 petitions docketed by OPA through May 15, 1943, indicates that they resulted in only approximately 20 separate price actions. The sum total of the price adjustments in these actions amounted to $80,570 daily, or approximately $29,400,000 on an annual basis, or about 2 cents per barrel on nationwide crude-oil production. Of this total, $52,100 daily or $19,000,000 on an annual basis, was represented by the increase of 25 cents per barrel in California heavy crude oils which was concurrently reflected in a 25-cent-per-barrel increase in fuel-oil prices. All the other adjustments in crude-price ceilings authorized by OPA have required absorption by refiners of the particular crude-price increase involved.

Shifts in product yields and transportation factors caused North Texas, Panhandle, and Tinsley crude oils to become more valuable to refiners than they had been previously. For this reason, it was logical for the

Mid-Continent Crude (36 Gravity) v. Raw Materials

(Commodity index based on 1935-39 average = 100)



The 1937-41 averages for raw materials and crude oil, excluding 1931 and 1933, were 104.2 and 103.4, respectively, showing what has happened to this long-term relation since price control was instituted

ceilings on these crude oils to be brought into line with general prices.

However, the amount of adjustment involved in these cases was relatively small, amounting to 11.5 cents per barrel in the case of Tinsley crude, 4 cents in North Texas, and 7 cents on Panhandle crude.

The OPA appears to be convinced that costs of production can and should be controlling in determining local crude-oil price adjustments. In July 1942 the Tariff Commission survey indicated a net per-barrel cost of production of $1.64 for Rodessa crude oil and a net cost of 71 cents for Golden Meadow crude, both produced in Louisiana. Yet, both crudes sold at an average price of between $1.16 and $1.19 per barrel based upon value to the refiner.

A number of factors may be responsible for providing entirely different cost conditions for crude oil of comparable quality produced in different fields or even in the same field. One field may have a large number of stripper wells while another more recently discovered field is still in a stage of flush production. The costs of drilling and acquiring acreage in the two fields may vary substantially and one field may be produced by an efficient operator and another by an inefficient operator. To attempt to adjust local crude-oil prices to cost of production would lead to a complete disruption of current practices.

Costs Influence Markets

Average costs of production tend to establish the "level" of nation-wide crude-oil prices, but the relationship between the prices of crude produced in various fields must be determined by the value of the crude in terms of access to market, refinery realization, cost of transportation, etc. Otherwise, crude oil of similar quality and even in adjacent fields or wells would sell at widely varying prices. It is obvious that a refiner will not pay a high price for a crude oil of a given quality merely because it is expensive to produce, when he can buy the same type crude at a lower price.

Local price adjustments have no bearing whatever upon the problem viewed by those who favor a general increase in crude-oil prices. The purpose of the general increase in prices recommended by many factions in the industry, by PIWC and by PAW was to provide funds for increased exploration, expanded secondary-recovery operations, expand rehabilitation and remedial work, and marginal drilling, in order that crude-oil-productive capacity might be substantially enhanced in an effort to meet requirements of the war program. Increased costs have reduced margins available for producing and exploratory operations. Local price adjustments authorized by OPA have had the effect of permitting underpriced crude oil to sell at the price to which it was entitled. The exception was in the case of California, where a 25-cent-per-barrel increase in heavy crude oils was reflected by a commensurate increase in fuel-oil prices.

Net incomes of most producers, after taxes, are not sufficient to permit them to take the risks involved in increased wildcatting and are not adequate to cover expenditures required for secondary-recovery operations, remedial and rehabilitation work, and marginal drilling.

Any argument that can be made for an increase in crude-oil price ceilings in a local area sufficient to create expanded exploration, secondary recovery, remedial and rehabilitation work, and marginal drilling can likewise be made for every other local area. Consequently, it is obvious that the only answer to the problem is the over-all price increase. Since such an amount would be more than refiners can absorb, it would be necessary, oil men concede, to reflect the crude-oil price increase in refined-product prices.

Second Rejection of PAW Plea Precipitates Appeal to Vinson

by Henry D. Ralph

WASHINGTON, D. C.—The Office of Price Administration has again rejected the proposal for a general increase in the price of crude oil, and has asked the oil industry to agree to a program for stimulating exploration by premium prices for oil from new discoveries, government loans for drilling, and higher prices in extreme shortage areas only.

This decision was contained in a letter from Prentiss M. Brown, price administrator, delivered to the office of Petroleum Administrator Harold L. Ickes August 7. The text was not made public immediately, but officials of OPA revealed its general content.

Administrator Ickes' office admitted receipt of the letter but declined to make public the text but from other sources it was learned that he immediately filed an appeal with Judge Vinson from OPA to lift the ceiling.

Still Doubts Effectiveness

Mr. Brown said he still holds to the view he expressed in his letter of May 1 refusing the increase of 35 cents per barrel which Mr. Ickes had requested on behalf of the Petroleum Industry War Council. He said he could not subscribe to the view that a general price increase is a cure-all for all the oil-supply problems, real or imaginary, particularly when there are other corrective measures which could be utilized.

Higher crude prices would not affect the imminent shortage of crude which Mr. Ickes is predicting, Mr. Brown said, declaring that because of the shortage of manpower it is doubtful if drilling can be increased regardless of the price. He also said that the facts refute the industry's claim that a higher price would stimulate exploration because there has been no appreciable increase in the number of wildcat wells completed nor in wildcat starts in California during the 4 months since OPA granted an increase of 25 cents per barrel in the ceiling price of California heavy crude.

The present price of crude is a fair price, Mr. Brown insisted, and producers as a whole are operating profitably. To prove this he cited the improved profit position of 19 oil-producing companies which file quarterly earnings reports. He said that in the past exploration has depended largely on financial aid from the large integrated companies and these companies are now in a position to continue to give such aid.

The supply of oil can be increased by additional transportation facilities from areas with excess producing capacity, and construction of such facicities is not dependent on an increased price of crude, the OPA chief stated.

The real answer to the oil-supply problem, he said, is what he described as Ickes' most recent approach to the problem, increased importations from foreign countries. He asserted that since United States reserves of petroleum are exhaustible it is only logical that our military and civilian requirements be supplied from foreign countries to the greatest extent possible. He declared that crude production in Venezuela and Colombia could be increased from 400,000 bbl. daily to 900,000 bbl. daily within a few months, and that the improving ocean-transportation situation should make this oil available.

(Continued on Page 44)

Colombian Production Hits Peak in General South American Rise

by J. P. O'Donnell

NEW YORK.—The paralysis which gripped the Latin-American oil industry with the advent of submarine warfare in the western Atlantic and Caribbean 18 months ago apparently has been overcome. This is indicated by reports on production in two of the principal oil producing countries in the Caribbean area. Venezuela, where output is said to be up 20 to 25 per cent, and Colombia, where a new monthly record has been set.

According to these reports, Venezuelan production in the first part of July neared 500,000 bbl. per day, a figure which would be 25 per cent greater than its average in the first 4 months of this year. In spite of this substantial gain, Venezuela's production rate is still only two-thirds of the peak it reached before Western Hemisphere marine traffic was disrupted. Therefore there is still considerable room for expansion.

Venezuela May Double Output

It has been predicted that Venezuela's production will probably be doubled within a year. If this prediction is correct, production in the Western Hemisphere's second oil country will exceed 800,000 bbl. per day and may reach 1,000,000 bbl. daily.

Before crude oil is exported to the United States, the more convenient refining capacity available in the Netherlands West Indies would undoubtedly be returned to maximum operation. The present level of Venezuela and Colombia production substantiates reports that the Aruba and Curacao refineries are now operating at or near capacity after a long period of curtailment.

Colombia's production in June is reported to have reached the highest monthly total in its history, 2,455,720 bbl. This compares with 2,336,000 bbl. the previous peak established in February, 1942, immediately prior to the advent of submarine warfare. Because that was a shorter month, daily average production in February, last year was 83,423 bbl. per day which compares with the daily average of 81,857 bbl. in June of this year.

Colombia's Position Enhanced

The June average, if continued, raises Colombia's production to a yearly rate of 30,000,000 bbl. which would rank it sixth among the oil producing countries, following the United States, Russia, Venezuela, Iran and Mexico. Rumania, before the attack by U. S. air forces early last week, was probably producing more than Colombia but production there unquestionably has been substantially reduced by the attack.

COLOMBIAN CRUDE-OIL PRODUCTION

Year and month—	Total	Daily average
1941:		
July	2,119.000	67,710
August	2,330 000	75,161
September	2,132 000	71.066
October	2,237.000	74,566
November	2,131.000	71.032
December	2.221,000	71,645
1942:		
January	2,213 000	71.387
February	2,336 000	83,428
March	1.296 000	41.806
April	1.072.000	35.733
May	1,121 000	36.161
June	785.000	26,200
July	469.000	15.064
August	379.000	12.226
September	348 000	11.600
October	198 000	6.381
November	184.000	6.131
December	188,000	6,074
1943:		
January	192.000	6.727
February	334 000	11.936
March	492 000	15.215
April	350 000	11.679
May	934 000	30 129
June	2,455,000	81.857

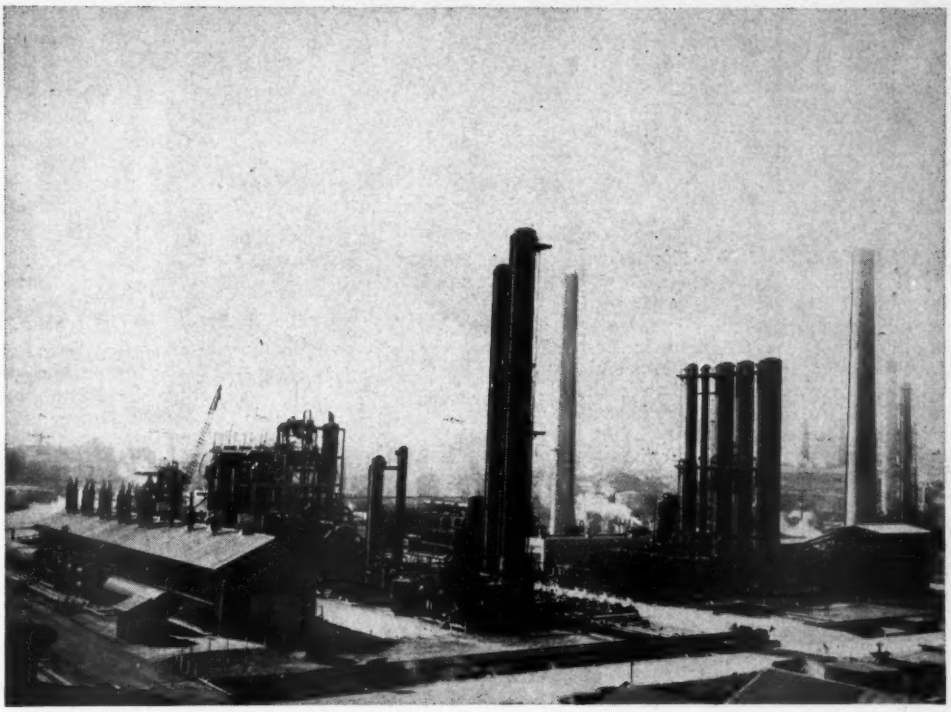
The rise in Colombian production has been phenomenal. As the accompanying table shows, January's total was doubled by March, the March total almost doubled by May and May's total more than doubled in June. Colombia was the most severely injured of all Latin-American countries proportionately. While Venezuelan and Mexican production was reduced approximately 50 per cent, Colombia's total at its low point was down 92.5 per cent from its pre-submarine-war peak. Part of Colombia's increased production is reported to be going to California.

This improvement in Colombia coincides with developments which may be among the most important in its history. In May, a Shell subsidiary discovered what may become one of the country's largest fields when its Dificil wildcat in the Magdalena Valley found production. This discovery is of special significance because of its proximity to the coast. A second well has been spudded, 1 kilometer north and 2 west of the discovery well. A second important development is the Socuavo production in the center of the Barco concession. Four producing wells have been completed and preparations are under way for the drilling of two more. If this warrants construction of a pipe line it could be extended to the small Rio de Oro field in the northernmost area of the concession and thus give the Barco three shipping fields. Third development is Shell's Casabe field, 225 miles south of El Dificil, which lacks a pipe-line outlet.

Tankers Key to Future

These developments undoubtedly will be accelerated as the tanker fleet of the United Nations expands. This expansion has been substantial in the first part of this year but remains below expectations. Tanker construction in this country in the first 7 months totaled 88 vessels, 80 ocean-going and 8 coastal tankers, aggregating 1,013,000 deadweight tons. Last year 62 tankers totaling 908,200 tons were completed. Thus, this year's completed tonnage is already more than was delivered in all of last year. It has been predicted that the average rate, which has been 12.5 tankers per month so far this year, will reach 20 per month in August.

The rate of tanker construction will determine the extent of the increase in oil production in areas controlled by the United Nations. Every ocean-going tanker added to the United Nations fleet will make possible an increase in crude-oil production of several thousand barrels per day. Thus, if 100 to 120 more boats are completed in the remaining 5 months of this year, the daily production of crude oil outside the United States may increase by several hundred thousand barrels by December 31, 1943.



This is Standard Oil Co. of California's toluene plant on the Pacific Coast, one of the petroleum industry's war facilities which received special mention in the current WPB progress report. Chairman Donald M. Nelson reported that construction of toluene facilities and synthetic-rubber plants was 90 per cent complete at mid-year and for all practical purposes could be considered a finished program

THIS WEEK

PRICES—OPA files second formal rejection of PAW recommendation for higher crude ceilings. . . . Suggests three alternatives to general advance. . . . Including bonus price for newly discovered oil, government loans for exploratory drilling, selected advances in areas of acute shortage. . . . ¶Administrator Ickes immediately appeals decision to Fred Vinson, economic stabilizer. . . . ¶Congressmen abandon hope for thawing frozen prices through executive channels. . . .

REFINING—Individually financed 100-octane plants now 63 per cent complete. . . . Government-financed projects, picking up fast, are 39 per cent in place. . . . Synthetic-rubber and toluene construction program of oil industry, virtually finished. . . . ¶Rating of AA-1 assigned Associated Refineries, Inc., 100-octane plant near Duncan, Okla. . . . ¶John C. Day, Tulsa, W.P.R.A. secretary, reports Middle West refiners short 30,000 bbl. of crude daily, AND 100,000 bbl. of idle capacity exists in nation. . . . Decreased operations on Gulf Coast, because of hurricane damage, probable for 60 days. . . .

MATERIALS—Amendment to P-98-b authorizes production operators to use AA-2X rating for all materials, except maintenance, repair and operating supplies. . . . ¶Eighty per cent completion of nation's war plants, reported by WPB, raises hopes for greater distribution of critical materials, next year. . . . ¶Most claimant agency requests for steel in fourth quarter cut 17 per cent. . . . Army, Navy, Aircraft and Maritime Commission get all but 9 per cent of their needs. . . .

TRANSPORTATION—WEP line-fill oil due to Phoenixville junction, Pennsylvania, this week. . . . Arteries to refining centers at Linden, Bayonne, N. J.; Philadelphia and Marcus Hook, Pa., progressing, will be ready for delivery service within few days. . . . ¶Tank-car deliveries to East Coast continue gradual slump, reflecting longer hauls now necessary. . . .

ADMINISTRATION—Greater authority delegated to D. E. Buchanan, director in charge of PAW District 3. . . . Has power to approve certain exceptions to spacing regulations, capital additions to plants, costing less than $5,000. . . . Change is another step in decentralizing PAW's Washington functions, aimed at expediting operations in the field. . . .

RATIONING—Details of equalization program pending formal announcement. . . . James F. Byrnes, director of war mobilization, expected to enunciate over-all policy on petroleum. . . .

SUPPLIES—East Coast index declines fraction, reflecting lag between filling WEP line and readjusted tank-car schedules. . . . ¶Administrator Ickes predicts another 100,000-bbl. decline in Middle West production by first quarter of 1944. . . . Also discloses that only 25 per cent of current national refinery production is automotive gasoline; it was 37 per cent before the war. . . . ¶Figures on May consumption of gasoline show decline of only 17.38 per cent compared to year ago. . . . Most moderate decline recorded since rationing started. . . .

Synthetic-Fuel Plans Approved

by Henry D. Ralph

A big majority of witnesses appearing at a series of hearings before the Senate committee on public lands and surveys favor prompt expansion of research and demonstration-plant construction for the purpose of developing technique for production of liquid fuels from coal and shale oil. Some prefer to assign these duties to private industry rather than to the Bureau of Mines.

WASHINGTON, D. C.—The federal Government should begin at once to conduct extensive research work on all possible sources of obtaining liquid fuel to be prepared in case reserves of crude petroleum should become exhausted at any time in the future, it was testified by a large group of witnesses appearing before the Senate committee on public lands and surveys August 3 and 4.

The committee hearings were on S. 1243, a bill to authorize appropriations for the Bureau of Mines to construct pilot plants for liquefaction of coal by various processes, the extraction of oil from oil shale, and other sources of synthetic-liquid fuels.

All the witnesses approved the general purposes of the measure, although there were some suggestions for limitations on the extent of government experimentation, and considerable difference of opinion over the possibilities of a petroleum shortage in the immediate future. The project was stressed as a long-range plan, and most of the testimony dealt with estimates of reserves of potential sources of fuel and with the technical methods of extracting oil from coal and shale as developed in Germany, England, and in experiments in this country.

Government Witnesses in Majority

Most of the witnesses were government officials, and the only oil industry men who appeared at Washington were Dr. Gustav Egloff, director of research of Universal Oil Products Co., Chicago, and Robert P. Russell, vice president of Standard Oil Development Co., New York. Both confined their discussions chiefly to the technical possibilities of various processes.

The opening witness was Harold L. Ickes, secretary of the interior and petroleum administrator for war. He declared that regardless of the size of our crude reserves and the prospects for new discoveries there will be a time when discovery will not keep pace with consumption, so the Government should be prepared with the basic research on other sources of liquid fuel. He said the bill does not propose competition with the oil industry and does not promise synthetic fuel cheaper than petroleum, but is a proposal to blaze the path for private industry to follow when it becomes necessary.

Ralph K. Davies, deputy petroleum administrator, said that as an oil man he does not oppose the potential competition from coal or shale, but wants the assurance of a continued source of oil. This is not a war project, he said, and probably would not be needed for many years after the war, but it is clearly demonstrated that there will be a time of declining reserves of petroleum and this nation should be as well prepared to use other sources of fuel as are other countries, even though it is vital to them and only potentially important to us. He expressed the view that the project should have the support of the oil industry because the proposed experimental plants will not compete with the oil industry but will only pioneer the way for its possible future development.

Dr. R. R. Sayers, director of the Bureau of Mines, described the bill as designed to lay the basis for the belief in the perpetuation of the gasoline age. He said it would be desirable to have private industry undertake the construction and operation of synthetic-fuel plants but no single company is in a position to risk the money in this development, and because of the huge stake of the public in continuing fuel supplies the Government should conduct the experiments.

Army Requirements Cited

Brig. Gen. W. E. R. Covell, chief of the Fuels and Lubricants Division of the War Department, endorsed the bill in a brief statement in which he said there is no indicated shortage of petroleum now but the supply of crude is diminishing and it is desirable for the Government to explore the possibilities and familiarize industry with the operation of new processes in order to provide a factor of safety. The committee was much interested in General Covell's statement that more than half of the tonnage of all supplies for the Army overseas consists of petroleum products, and in the case of North Africa it was 65 per cent.

W. Jett Lauck, economist for the United Mine Workers of America, endorsed the bill as a possible means of increasing employment in the coal mining industry in the future.

Dr. W. E. Wrather, director of the U. S. Geological Survey, told the committee that petroleum supplies are now adequate and will remain adequate indefinitely, but reserves are bound to diminish some time and there is no scrap or secondary use to fall back on as in the case of metals. He pointed out that about 34 per cent of the total energy generated in the United States comes from petroleum and about the same from gas, and that the present demand on some oil fields is heavier than their economic rate of production.

Private Industry Favored

John D. Battle, executive secretary of the National Coal Association, endorsed the objectives of the bill but declared that the Bureau of Mines should conduct experiments only to the point of extracting a basic liquid from coal and should let private industry develop methods for refining.

James Terry Duce, director of the Foreign Division of PAW, gave the committee an outline of world possibilities for the discovery of new petroleum reserves, illustrating his testimony with a geological map of the world and charts showing the most likely areas for future oil developments. He pointed out that while there are large areas in the United States which probably will be found to have valuable oil deposits, the greatest possibilities for the future are in Russia, the Near East, and other foreign areas.

William B. Heroy, director of reserves for PAW, presented a paper on the supply of crude petroleum within the United States, in which he said that if it had not been for the increased demands of the war there would be little thought of possible exhaustion of oil reserves but it is now necessary to make a reappraisal. He pointed out that while we still have large reserves, in recent years the rate of new discoveries has been lower than demand. He admitted that geologists were divided in opinions as to future discoveries, but said that while the facts do not warrant a defeatist attitude the bonanza days

of oil discovery belong for the most part to history.

Mr. Russell filed with the committee a technical paper on work done by his concern in experimental production of gasoline from coal, including estimates of the costs and amounts of steel required by various processes. Illustrating his testimony with charts, Mr. Russell said that hydrogenation of coal by either of the two processes used in Germany would be much more expensive than the application of these processes to natural gas or to crude petroleum, and suggested that shale oil and tar sands probably would be utilized before coal as sources of liquid fuels. He said his company was about ready before the war to begin production of synthetic liquid fuel from natural gas by the Fischer process. He endorsed the general objectives of the bill, however, and said that the oil industry has great confidence in the Bureau of Mines.

Foreign Processes Explained

Bruce K. Brown, assistant deputy administrator for PAW, described the various processes for production of liquid fuels from coal as used in Germany and England. He declared it should be apparent to everyone that there is a threatened shortage of crude petroleum, and endorsed the bill as providing the necessary "know how" for producing liquid fuels from other sources. Questioned by the committee, Mr. Brown said that in Germany the liquefaction of coal is commercially practical but only because it was German policy to become self-sufficient in gasoline and that the synthetic fuels were produced at a cost far above that of imported petroleum products. He said that the Germans are not suffering from poor quality aviation gasoline, and while the fuel in planes shot down was only about 95 octane, the German engines were designed for this fuel and their performance was satisfactory.

Mr. Brown said that the Fischer process probably would be applied to liquefaction of natural gas by private industry in this country very soon, but that the Government should conduct experiments in liquefaction of coal, since natural gas would last only 3 to 5 years if it had to supply all liquid fuel demands as well as all present uses, and it would not be profitable for a private company to build a plant to liquefy gas except in certain areas where it could obtain assurance of continued availability of large supplies of gas not immediately needed for fuel in its present state.

Dr. Egloff said he agreed that the Government should study every possible source of fuel production in the United States, but he was not enthusiastic about coal hydrogenation. He said he was not one of the gloomy prophets on future oil supply and he disagreed with Secretary Ickes as to an impending shortage, saying that we have not tapped our petroleum resources and if we search enough we will find large quantities in this country. He explained in some detail coal hydrogenation processes as used in plants he has visited in England and Germany, and said that it would require 8,000,000 men per year to mine enough coal to supply this country with gasoline at the current rate of consumption, although he said American engineers are so superior to European that the processes probably could be operated much more efficiently here than abroad.

Harris and Ewing

Secretary Ickes demonstrates operation of an engine on synthetic-liquid fuels produced from coal. Senator O'Mahoney works the throttle as Rep. Jennings Randolph of West Virginia, Sen. Chan Gurney of South Dakota, and Sen. Abe Murdock of Utah look on

Coal Hydrogenation Costly

While supporting government research on coal, Dr. Egloff suggested that more immediate benefit could be obtained from other studies, such as secondary oil-recovery methods, oil and tar sands, compressed liquefied gases, producer-gas generators on vehicles, and oil shale. He said that mining oil sands in shallow depleted oil fields probably would supply very large quantities of oil at much lower cost than hydrogenation of coal.

Other witnesses supporting the bill included: Martin J. Gavin of the PAW Foreign Division, formerly in charge of oil shale experiments for the Bureau of Mines; C. Stribling Snodgrass of the PAW Foreign Division, who described oil liquefaction processes in Germany; A. C. Fieldner of the Bureau of Mines, who presented a technical discussion of hydrogenation processes; and H. H. Storch of the Bureau of Mines, who described German synthetic fuel processes.

Oklahoma Discoveries Given Bonus Allowable

OKLAHOMA CITY, Okla. — The state Corporation Commission has issued a formula for determining special allowables to discovery oil wells, which became effective August 1.

Discoveries completed at a depth of 2,000 ft. or less are granted a bonus of 5,000 bbl. before being subjected to the usual production allocation. Wells deeper than 2,000 ft. are placed on a per-foot basis. For example, a 6,800-ft. well would get an allowable of 5 bbl. per foot or a total of 34,000 bbl. The top of the producing horizon is designated as the pay zone.

Bonus oil must be produced on a day-to-day basis over a period of 1 year. The allowable may be transferred to other than the discovery well on the lease, or divided among other wells on a unitized lease, but may not be transferred to wells on other leases or units.

Commissioner W. J. Armstrong did not sign the order, his contention being that the formula should have been set up as a special order or by journal entry.

In the opinion of some lawyers the granting of special allowables is illegal.

Ickes Explains Need for Reducing Gasoline Use in Midwest and Southwest

Shortage of crude oil was cited as the basic cause for lowering motor-fuel consumption in the inland states. Herein, Mr. Ickes expresses PAW views. Some members of the informal congressional committee did not agree with his reasoning, but equalization is considered inevitable.

THE industry and general public this week geared operations and consumption to the gasoline-equalization policy. Objections from the Middle West have not yet subsided although Petroleum Administrator Ickes attempted to explain the logic behind the move at a conference in Chicago last week with an informal committee of congressmen.

Meanwhile, statistics on consumption for May indicated that the national requirements in that month were only 10.81 per cent below the same month a year ago. This decline was the most moderate reported since rationing became effective. Gallonage during the first 5 months this year was off 17.38 per cent from the comparable 1942 period. The declines for April were 14.10 and 19.92 per cent; March, 15.98 and 21.73; February, 19.48 and 24.81, and January, 29.5 per cent.

The figures on consumption, while indicating a relaxation of the effectiveness of rationing, actually reflect some of the voluntary curtailment in the interior states previous to coupon rationing.

Texas' Increase Continues

Texas consumption, reported a week ago to be more than 50 per cent devoted to federal requirements, continued its significant increases shown in recent months. Texas gallonage was up 58.1 per cent in May and has increased 29.9 per cent for the 5 months.

Although protests continued from Middle West congressmen, there is general agreement that the equalization program is inevitable and that administrative authorities in Washington have been in substantial agreement on details for several days.

Administrator Ickes explained at Chicago that the basic reason for curtailment of civilian consumption is the failure to replace current withdrawals with adequate discovery of new reserves. And this deficiency in finding new oil, he said, goes to the heart of military operations. He cited Brigadier General Covell's testimony that more than 65 per cent of the military supplies shipped to North Africa consisted of petroleum. "Unless important new discoveries are made," Administrator Ickes declared, "the natural decline in the productive ability of the fields in the United States—a decline that ranges from 1 to 2 per cent each month—a widening gap between the productive capacity of the United States and the anticipated crude-oil requirements will develop.

"In the Middle West, which produces about 25 per cent of the United States' total, production has been falling off substantially as many of the fields enter their period of decline, hastened in many instances by wasteful production methods.

"The stocks of crude oil aboveground in the Middle West, available to make up for the deficiency in production have declined since Pearl Harbor. These stocks have declined from 29 million barrels to 19 million barrels between Pearl Harbor and July 1943. True, the published stock figures show total stocks are now 69 million barrels as against 79 million barrels in December 1941. But these figures are misleading and the first figures I have given you are the true comparisons.

"Fifty million barrels of crude oil are tied up at all times in a working inventory that must be maintained if the industry is to continue a smooth and flexible operating schedule. This oil is tied up in pipe-line fills, in working tanks at pipe-line terminals and refineries. This 50-million barrel minimum working stock is an estimate on which both my staff and the petroleum industry in the Middle West are agreed.

"The total crude-oil production from the district has declined from a daily average of 1,180,000 bbl. per day in December of 1941 to 940,000 bbl. per day during July of this year. Production experts see little hope in sight for reversing this trend in the light of the meager results of exploratory efforts of the past several years. Oklahoma, Illinois, Indiana, and Nebraska, which together account for 570,000 bbl. of our current daily production, are steadily declining. Kansas, Michigan, and Ohio, which account for 370,000 bbl. of our current daily production, are holding at levels of the recent past. Only in Kentucky, which accounts for 23,000 bbl. or only 2.4 per cent of current production, have there been any recent increases. A 10,000-bbl.-per-day increase over the average of 6 months ago is attributable to a single new pool in Henderson County.

"Although the search for new reserves and new productive capacity is continuing and is, in fact, being accelerated throughout the district, the results have been disappointing and the decline is expected to continue so that daily production will drop another 100,000 bbl. by the first quarter of next year. It is already necessary to ration crude oil among refineries in this district, so that all can be kept in operation. Crude oil is being imported into the district, more now than ever before, but there is a limit to what can be done along this line, first because other areas cannot spare it, and second because the pipe lines and other transportation facilities are already being operated at capacity. The district is no longer self-sufficient, so far as oil is concerned.

One Expandable Area

"The Petroleum Administration's District 3—Southwest and Gulf Coast—produces about 50 per cent of the United States total. This is the only district in which there exists any substantial reserve productive capacity in known developed fields. Most of this excess capacity is in West Texas. Lesser amounts, existing in a few fields in the coastal areas of Texas and Louisiana and in eastern Texas are rapidly being absorbed by large month-to-month increases in crude requirements. Additional transportation is now being made available so that the added West Texas capacity can be utilized. However, by the time that the pipe lines and other methods of transportation are ready to haul additional West Texas crude, the demand probably will have increased so much that the entire production will be absorbed.

"Yet the crude-oil problem—though basic—is only the beginning of our difficulties. Refining limitations com-

(Continued on Page 46)

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BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

A Manpower Oversight

MANPOWER requirements of the petroleum industry generally have not been given the consideration to which they are entitled in relation to their war importance, but they appear to have been overlooked entirely in the operations of an important arm.

The oil-well supply companies, which are often termed "as essential to the oil industry as ammunition is to a gun," have been largely left alone in their efforts to maintain an adequate personnel to serve all branches of the oil industry. It is agreed that those charged with the responsibility of supplying operators with materials and equipment and many services have already gone further than they should have in personnel contractions and in the use of substitute employes.

It isn't necessary to sell operators in the fields and in the plants regarding the important part that the supply companies play in their activities. They know that the suppliers afford them a service not available elsewhere, which often extends around the clock every day of the year and without which there would be a quick and permanent cessation in operations extending from the drilling well to the delivery of finished products.

Right now these services are more important to the oil industry than ever before. With their personnel depleted, their own inventories of materials reduced, and their normal activities circumscribed with governmental regulations, producers and refiners can only do their part in the war effort through the assistance of manufacturers and suppliers.

These same companies have carried most of the load in interpreting and carrying out the priority regulations which, of itself, is a major accomplishment aiding both the Government and the industry.

Manpower cannot be readily replaced in this phase of petroleum operations. It takes years to train men in the varied distributing and the technical services of the established supply companies which are found in all old and new areas.

And yet a member of a local draft board wrote: "We are constantly in touch with activity and occupational bulletins of the director of Selective Service, and in searching these bulletins for essential services, we failed to find oil-field store managers mentioned."

The same findings are reported in the case of technically trained men who, through the knowledge of operating practices in the fields and refineries and the application of equipment to them, offer a service through their employers which cannot be duplicated.

The war agencies in their administrative actions have often recognized the essential part that the suppliers play in petroleum operations. They are, for example, through the action of the War Production Board, in charge of the emergency stocks of tubular goods established throughout the oil country to expedite the search for and the production of new oil. Nevertheless, men in charge have been refused deferments.

No time should be lost in changing this situation. The companies concerned are entitled to the full support of PIWC, PAW and the oil industry in insisting on immediate relief. Supplying and servicing are an integral part of the oil business, and all major policies of this industry, including manpower, should recognize that fact.

Oil Companies Advised to File Revised Schedules For Replacing Fathers

OIL companies this week started preparation of replacement schedules on fathers within the selective-service age brackets in order to cope with the newest manpower problem confronting industry. Decision to call up fathers with children born before September 15, 1942, was announced August 3 by the Selective Service Commission with the approval of the War Manpower Commission.

This new change in the draft status of approximately 2,500,000 men, including hundreds of oil-industry employes previously immune under Selective Service policies, will hit many companies much harder than former operation of the draft.

Many of the key positions in the oil industry are occupied by men with families. Generally speaking, the top operating men are mature and seasoned with long experience in their particular jobs.

Beginning October 1, local boards have been authorized to draft married men between the ages of 18 and 38 who have children born prior to September 15, 1942. This action, Selective Service announced, has been necessitated by the exhaustion of available registrants of other categories in many parts of the country.

Previous Schedules Obsolete

Many companies in the industry filed replacement schedules with the various state directors of Selective Service in May and June. In accordance with Selective Service regulations which were in effect then, such replacement schedules did not list for replacement any married men 18 to 38 with children. Replacement schedules are in force for 6 months after acceptance.

Accordingly, it is obvious that many replacement schedules filed during May and June will not expire before November or December. Consequently, many companies have replacement schedules in effect which provide no protection for married men with children subsequent to October 1.

All companies operating under replacement schedules have been advised to immediately file supplementary replacement lists with the state directors, listing all married men between the ages of 18 and 38 who have children born prior to September 15, 1942.

The supplementary replacement lists should be filed, oil companies were advised, to cover only that part of the 6 months affected by the current replacement schedule which has not yet elapsed. Such action will lead to simultaneous expiration of presently accepted schedules and supplementary lists. Consequently, upon the expiration of the present schedule and the supplementary list, both groups of employes may be covered in the replacement schedule which normally would be filed at the expiration of the present replacement schedule.

It will not be necessary to fill the Selective Service draft quotas for the months of October, November, and December exclusively from the ranks of married men with children. Accordingly, it will probably be permissible to schedule all married men with children for retention for the entire 6 months covered by the supplementary replacement list, with the exception of those persons whose minimum emergency training time as shown in PIWC manuals of job descriptions and training times is 2 months or less. Therefore, all men on the supplementary replacement list should be scheduled for retention for 6 months or more. Exceptions to this rule are common laborers, janitors and other employes who require little or no training. These persons should be shown for release to Selective Service at earlier dates, although it is possible that many of them will not be called prior to January 1, 1944.

The period of 6 months to be covered by the supplementary list should be the same 6 months' period covered by the replacement schedule now in force. As a result persons covered in the supplementary list will not be shown for deferment for 6 months from date of filing of the supplementary list, but rather for 6 months deferment from date of acceptance of the present schedule.

It is important that individual companies file supplementary replacement lists as indicated at the earliest possible moment. It has been repeatedly demonstrated that prompt filing of material requested by Selective Service is of much value.

Federal Order Digest

PAW Regulations

Field Classification — PAO 11, Amendment 1: Removes Lake Chicot and Schuler lime pool of Sligo field, St. Martin and Bossier parishes, Louisiana, respectively, from list of condensate fields, issued August 2.

Asphalt—PD 66, amended: Permits specification of Oliensis Spot Test, A.A.S.H.O., designation T102-38, in addition to federal specifications, only on surfaces on which aircraft travel, effective August 5.

Administration—Delegation of authority: Instructions from Ralph K. Davies, deputy administrator, assigns broader powers to D. E. Buchanan, director in charge of District 3, to expedite all types of operations, issued August 5.

OPA Price Regulations

Crude Oil—RPS 88, Amendment 118: Lifts ceilings on Kentucky production 5 to 12 cents per barrel; simplifies procedure of establishing price for crude from all new fields, effective August 9.

Crude Oil—Letter to PAW; Rejects for second time proposed increase of 35 cents per barrel in general crude-market structure, delivered August 7.

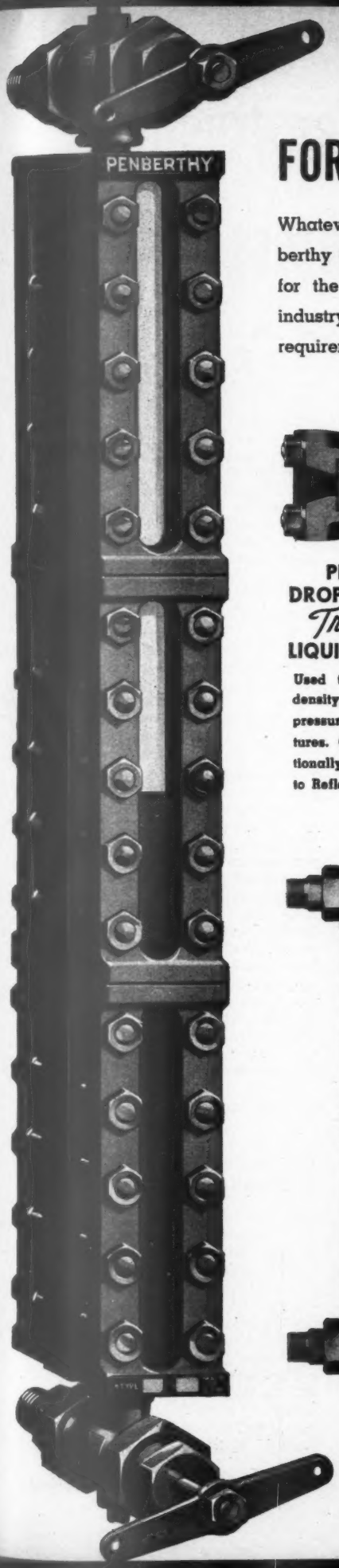
Plastic Pipe—MPR 188 and MPR 406, Amendments 8, 18 and 1, respectively: Sets uniform dollars and cents ceilings and discounts for producers, distributors and retailers of "Saran B-11" made from vinylidene chlorides, effective August 9.

Fuel Oil—Plea renewed calling on householders to use new rationing coupons by placing orders with their dealers immediately, issued August 8.

WPB Regulations

Aromatic Solvents — AO M-150, Amendment 1: Reduces the classification of primary products from 17 to 11, simplifying the allocation order, issued August 4.

Steel Allocation — Distribution to claimant agencies under CMP for fourth quarter totaled about 15,500,000 tons. Requests of Army, Navy, Aircraft Resources Control Office and Maritime Commission reduced about 9 per cent; all requests, including those for export, reduced about 17 per cent, issued August 9.



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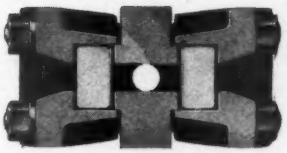

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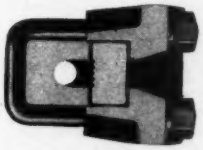

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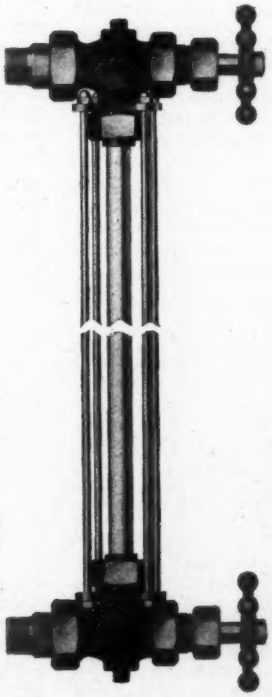

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Aviation-Gasoline-Plant Construction Features WPB Current-Progress Report

WASHINGTON, D. C.—Progress in construction of facilities for production of 100-octane gasoline stood out in bold relief in the current War Production Board midyear report on construction of government-financed war plants.

The largest percentage gain in the first 6 months was registered for plants to produce 100-octane gasoline. At the beginning of the year, WPB Chairman Donald M. Nelson reported, less than 1 per cent of the government-financed program was in place. By July 1, the program was about 39 per cent complete.

High-octane-gasoline plants have been granted top preference ratings, and steady increases in the program may be expected over the remaining months of the year, Mr. Nelson said. Even greater progress has been made in the privately financed high-octane program, he reported, where, by July 1, around 63 per cent of the expansion had been completed.

Other Optimistic Developments

Other phases of the WPB report were considered encouraging for the petroleum industry which has been held at the bare-subsistence level in the consumption of critical materials since start of the war. The slightly more optimistic attitude among oil men is based on declaration that about 80 per cent of the government-financed war-facilities program was complete at midyear. Since the oil industry's use of steel was drastically curtailed at the war's outbreak, many oil men have contended that restrictions would be at least slightly modified as soon as war plants were completed. It is recognized, of course, that as plants for making end products were completed the demands for raw materials would increase accordingly. There is a general impression imbedded in the minds of oil men, however, that materials essential to the continued high level of crude-oil production, transportation and manufacture of products will become more readily available during the first quarter of 1944 and in later months of the war.

Military developments, it is conceded by equipment manufacturers, will exert strong influence on just how far the WPB can afford to liberalize restrictions on consumption of steel and other critical products by the oil industry. Cancellation of a large contract for tanks last week by the War Department is pointed to as one straw in the wind, indicating certain alterations in the demand for war products which will tend to free larger volumes of steel for essential industries.

Privately financed aviation-gasoline projects are more than 63 per cent complete and the government-financed program is nearly 40 per cent in place. Other significant progress reported by WPB may indicate modification of restrictions on critical materials in the near future.

At the end of June, the completion of $12,038,000,000 out of a current $14,582,000,000 government-financed war-facilities program had been accomplished, Mr. Nelson reported. That compares with 61 per cent at the beginning of the year and only 34 per cent a year ago.

The midyear mark saw outstanding accomplishment in the construction of plants to produce finished munitions such as guns, combat vehicles, aircraft, ships and ammunition. Facilities for production of ammunition and explosives were 95 per cent completed.

Arsenal Nearing Completion

This remarkable record, Mr. Nelson declared, means that the arsenal which America is building to defeat the Axis is rapidly nearing completion, and as facilities construction moves along a planned decline, more and more of the nation's resources can be thrown into the direct production of munitions.

The construction and equipment of plants to produce raw materials, such as synthetic rubber and steel, was fast catching up after earlier tendencies to lag. The extent of the advance which has been gained in this category this year is illustrated by the synthetic-rubber program. Only 3 per cent finished a year ago, the synthetic-rubber program was 15 per cent in place at the beginning of 1943 and had risen to 61 per cent by the end of June.

It is only since the beginning of this year that raw materials facilities passed the half-way mark, Mr. Nelson pointed out. For example, while only 15 per cent of the federally financed synthetic-rubber program was in place on January 1, construction and equipment deliveries moved rapidly ahead to the favorable position they occupied at the end of June after receiving preferential treatment for components.

Steel Program Advanced

An encouraging picture is reflected in the iron and steel program, which is now more than 75 per cent in place. Seven of the plants that are the farthest advanced are being rushed to completion this year, and these alone will make up about one-third of the entire program.

In the field of chemistry, the rate of expansion has been extremely favorable. Only 31 per cent complete a year ago, the chemical program had risen to 66 per cent at the beginning of 1943 and currently is more than 90 per cent completed.

An analysis of the Government's war projects this year clearly indicates that the end of the munitions-facilities program is the beginning of the end of the raw-materials program. Of the facilities completed in 1942 the largest proportion—70 per cent—went into ordnance, aircraft, and shipway facilities, while only 21 per cent went into raw materials. This year, on the other hand, 40 per cent of the facilities scheduled for completion is destined for raw materials and 50 per cent for end munitions.

Two Louisiana Fields Reclassified as Oil Areas

WASHINGTON, D. C.—Two fields in Louisiana have been removed from the classification of condensate fields through an amendment to Petroleum Administrative Order 11. Reclassified fields are Lake Chicot, in St. Martin Parish, South Louisiana, and the Schuler lime pool of the Sligo field, in Bossier Parish, North Louisiana. Reclassification of these fields means that special permits will no longer be required before drilling wells, and the usual 40-acre spacing provisions of PAO 11 apply.

Retain Patent System, Correct Abuses, Investigating Committee Recommends

by Arch L. Foster

THE patent system is the foundation of American enterprise and has demonstrated its value over a period coextensive with the life of our Government. The principle of recognizing a property right in intellectual creation is sound and should be continued as contemplated in the Constitution."

The Patent Planning Commission thus eulogized the existing United States patent system in its report on a study of the American method of rewarding inventors and encouraging industry. Headed by Charles F. Kettering, head of General Motors' Research Division, the commission was created by Executive Order 8977 on December 12, 1941.

The report voices the commission's confidence that the creating principles of the patent are the best used by any country, and strongly recommends their continuance. It points out a few actual and a few possible abuses and recommends ways of correcting them. It recommends several improvements in procedure to simplify and to implement the system for the greater protection of both inventor and public. The commission promises other reports dealing with recommendations and findings regarding inventions by government employes, on means for increasing and encouraging invention and the utilization of war-industry facilities in peacetime.

Inventiveness Rewarded

Among the seven advantages which have resulted from the use of our patent system, reported by the commission, are that it has encouraged and rewarded inventiveness and made more new products possible; stimulated development of the major portion of our greatest of all industrial systems; speeded up development and application of inventions more than in any other country; contributed to the highest standard of living the world has yet known; stimulated products and processes necessary to arm the nation and to wage war; contributed to public health and safety, and protected small businesses during the early formative period of their development.

The commission recommends improvements in the present system on

Conclusions of the Patent Planning Commission summarized in this report are the result of a fair and impartial investigation. The commission suggests certain correctives for abuses that have developed under the United States system but, in general, finds that the advantages far outweigh the deficiencies. Creative incentives of the patent system, the commission found, result in prompt passage of benefits to the public, one of the most conclusive tests of value.

10 different counts, then passes without recommendation innumerable suggestions, most of which are passed along to the Patent Office Advisory Board for consideration. The recommendations are:

1. Enactment of legislation which will compel the recording in the U. S. Patent Office of:

(a) All existing agreements to which one of the parties is a citizen of a foreign country.

(b) All existing agreements regardless of the citizenship of the parties which include any restrictions as to price, quantity of production, geographical areas or fields of use.

(c) All future agreements regardless of restrictions or citizenship of the parties.

2. A statutory provision that, in a suit for infringement, the recovery of a patent owner shall be limited to reasonable compensation without prohibiting use of the patented invention whenever the court finds that the particular use of the invention in controversy is necessary to the national defense or required by the public health or public safety.

3. That any citizen have right to challenge the validity of a patent, within 6 months after its issuance. Failure to so challenge within the specified period shall not prejudice the rights of anyone in any later infringement suit. Initial challenge to be in the Patent Office, with appeal to the Court of Customs and Patent Appeals; the patentee shall have the services of an officer in the nature of a public defender.

4. A public register to be placed in the Patent Office, in which shall be listed all patents under which their owners are willing to grant licenses at stated or reasonable terms. Commissioner of Patents shall fix license terms when the parties are unable to agree, after the commissioner has heard both parties, with appeal to the Court of Claims and Patent Appeals permissible.

5. A declaration of policy whereunder patentability shall be determined objectively by the nature of the contribution to the art, not subjectively by the nature of the process employed.

6. Certification of the case record to the Patent Office by a District Court in the event of an infringement suit, for a report on the patent's validity. The Patent Office report of the effect on the validity of the patent of the case record is to be advisory.

Suggested Legal Procedure

7. Establish a single court of patent appeals. Extend jurisdiction of the Court of Customs and Patent Appeals to include this field; have the new court meet elsewhere than in Washington; have United State chief justice assign additional judges as may be necessary to the court at and for such times as may be necessary in the public interest.

8. Enactment of a 20-year [patent period] bill in "substantially the same form" as H.R. 3211, Seventy-seventh Congress.

9. In ex parte cases, the jurisdiction of the Court of Customs and Patent Appeals to review the denial of the Patent Office of a patent application be made exclusive, eliminating the present concurrent jurisdiction of district courts.

10. Further changes in interference practices now considered inadvisable. Patent Office Advisory Committee expected to explore this entire subject in the light of the present report.

In addition to the above recommendations, the commission decided against specific suggestions in this report on several subjects which came up before it. These subjects include procedural suggestions, compulsory licensing, different patent terms of years, and others not considered of

major importance, or which will be compiled and referred to the Patent Office Advisory Committee.

Reasons for Recommendations

A better understanding of the meanings of these recommendations and the commission's reasons for making them in the form it finally adopted may be had by summarizing the report's discussion of each recommended improvement.

Stating flatly the principle that the chief beneficiary of the patent system should be the American public, it is pointed out that patent privileges can be, and in some instances have been abused. If a patent be commercialized, the public has the advantage of the use of a new product or process. If not commercialized then the public benefits by the recorded knowledge contained in the disclosures of a patent, which otherwise might and presumably would remain undisclosed to the world. The abuses which have been practiced on occasion are not due to the patent itself but to secret, illegal and improper agreements, presumably revolving around a patent or patents, into which citizens may enter. The exposure of such agreements will at least make them detectable and minimize the abuses. Therefore the commission recommends that these agreements be made available in the records.

The commission decided unequivocally against the adoption of a general compulsory licensing system in the patent policy. This plan of opening all patents and processes based thereon to license is held by critics of the patent system as the most effective measure for preventing "monopoly" by patents and patent holders. In these discussions the patent-system attackers have overlooked the fact that a limited monopoly is the purpose of all patents, to secure to the inventor his property in a patent in the same manner that his interest in a factory or farm is protected against aggression or misappropriation. However, to eliminate or minimize abuses which may be perpetrated against infringers, the proposal to limit the recovery of damages in infringement suits in effect eliminates "exemplary damages" or punitive damages against an infringer for appropriating the patent property. This proposal also insures to the public and the country the use of any patent idea or process when it is deemed necessary to public defense, health or safety, which prevents a patent holder from withholding the advantage of his idea in times of stress or emergency.

Right of the Government to revoke a patent, a privilege which does not now and has not existed in the past, is tacit admission that the Government's part in obtaining and granting a patent is imperfect. Many long have contended that it is entirely impracticable to maintain enough patent examiners of the experience and knowledge necessary to determine in every case whether or not an application contains a new or patentable idea. In the past, many patents have been granted which will not stand the light of investigation or challenge on either count, of patentability or of validity. Therefore in order to bring into the record any information which may affect the validity of a patent the suggestion is made that anyone may bring any patent into question in the Court of Customs and Patent Appeals. To prevent the patent holder from being bilked by endless expense incident to such validity precedures a public defender is to be provided who defends the patentee's rights in the investigation.

Two Glaring Weaknesses

The lack of a definite, applicable standard or "yardstick" for determining patentability and validity is rated by the commission as the "most serious weakness of the present system." It is noted that this weakness is a matter of detail and of procedure, and has nothing to do with the main principles underlying the patent system. Rating it as a weakness merely points out items wherein experience shows ways of improvement.

Price Appeal to Vinson

(Continued from Page 31)

Mr. Brown said he had previously asked Deputy Administrator Ralph K. Davies informally to ask the oil industry to agree to alternative methods of increasing exploration, and he now formally presented to Administrator Ickes a three-point program for submission to the Petroleum Industry War Council. These proposals are:

1. A premium price for oil from new wells drilled in unexplored fields.

2. Government loans up to 66⅔ per cent of the cost of drilling new wells in unexplored fields, such loans to be repayable only out of the proceeds from these wells. (Mr. Brown said that would give new and independent producers roughly the same advantages as those now enjoyed by the large companies which may write off the cost of wildcatting against their excess profits taxes.)

3. Possibility of a higher price on a zone basis in the extreme shortage areas.

It is understood that the letter made no reference to stripper wells or to secondary-recovery projects, although on previous occasions OPA officials have said they would consider proposals for higher ceiling prices on crude obtained from such wells as distinguished from a general-price increase. Neither was there any definition of "extreme shortage areas" in which OPA might be willing to permit higher prices. According to some forecasts of imminent shortages this might soon include most of the United States except West Texas.

The OPA proposal undoubtedly will be presented to the PIWC at its September meeting.

The fact that OPA has now formally rejected Mr. Ickes' second request for a crude price increase makes it technically possible for PAW to appeal the decision to Director Fred M. Vinson of the Office of Economic Stabilization, and Mr. Ickes has stated that he would make such an appeal if and when the request was denied.

Failure to get satisfactory action from the OES probably would lead to an appeal to Director James F. Byrnes of the Office of War Mobilization. Mr. Byrnes has been making a study of the entire petroleum situation, and is expected to issue a report shortly. It is understood that members of Congress from oil-producing states are already besieging Mr. Byrnes' office with letters and telegrams declaring that if the crude-price ceiling is not raised soon Congress will take legislative action when it resumes its session in mid-September.

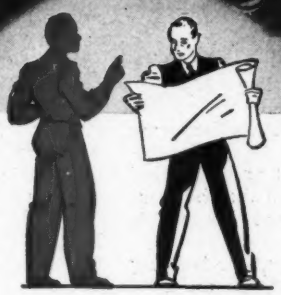
On the day before it became known that Mr. Brown's letter had been sent to Mr. Ickes, Rep. Wesley Disney of Oklahoma issued a statement denouncing OPA for its delay in announcing its decision, a decision which Mr. Disney said had been made 10 days earlier. He said the delay made it impossible to take an appeal to the OES, and declared:

"Divided authority has nullified attempts toward constructive activity. It has become more and more apparent that legislative action is necessary if we are to avoid a national oil shortage—worse than we already have."

Liberty Ship Edwin L. Drake Launched at Baltimore

BALTIMORE, Md.—The new Liberty ship, Edwin L. Drake, named in honor of the man credited with the first producing well, drilled for oil in the United States, was launched recently from the ways of Bethlehem-Fairfield Shipyard, with the brief ceremonies prescribed by secrecy, pressure, and wartime urgency.

The Bethlehem-Fairfield Shipyard has informed John P. Herrick of Olean that the Liberty ship Orville P. Taylor will be ready for launching either the last of August or early in September. One of Mr. Taylor's three granddaughters will christen this ship. Mr. Taylor completed the first flowing oil well at Petrolia, Scio Township, Allegany County, New York, June 12, 1879, and is honored in oil history as the "Father of the Allegany County Oil Field."



then I said to myself—

Here's How to Reach That Post-war Market Quick

So you want to get the jump on competition — **get to that post-war market first with the most sales features?** *Then take a tip from the Army's amphibious truck—the "duck".*

Well, it is a versatile vehicle—carries troops or cargo across water or land—doesn't even stop in going from one to the other. Say, if only I could do likewise—drive straight ahead without a stop and with all our people aboard—in going from war products to peacetime products.

Then, hop aboard the vehicle used by builders of the "duck", the Liberty ships, the M-4 tanks, the bombers and fighters, and hundreds of other war products. They went from peacetime products to war equipment almost overnight. Their vehicle is WELDING.

Sounds logical. Welding does simplify design . . . quickens tooling up . . . speeds production . . . makes selling easier because it makes products better and cheaper.

And one more suggestion. Learn how to drive this V-day vehicle fast and straight with Lincoln's aid on welded design and procedure. Start NOW.

THE LINCOLN ELECTRIC COMPANY, CLEVELAND, OHIO

Kentucky Oil Ceiling Increased 5-12 Cents

WASHINGTON, D. C. — Ceiling prices on Kentucky crude oil were raised 5 to 12 cents per barrel, effective August 9, by the Office of Price Administration.

The Kentucky advances, OPA asserted, are in continuation of its policy of making individual adjustments in crude-oil ceilings where they are shown to be justified and where they will not be contrary to the "hold the line" order.

Daily crude-oil production aggregating 8,000 bbl. is affected by the increases.

In Woodsboro field, Refugio County, Texas, where an increase of 10 cents per barrel is granted to the royalty owners, to $1.25 per barrel, flat price, the sole purchaser of this crude in the field advises that he will absorb the increase if granted, and that the price to the refiner or user would not be increased. On the other seven-eighths of production the existing ceiling price of $1.25 per barrel continues.

The new ceilings in Kentucky, and comparison with the old ceilings, each ceiling being for all gravities, follow:

	Per barrel — New ceiling	Old ceiling
Big Sandy River (Somerset crude)	$1.43	$1.38
Sebree field, Webster County	1.37	1.32
Belton field, Muhlenberg County	1.37	1.25
Spottsville, Henderson County	1.37	1.25
Owensboro area	1.37	1.32
Bowling Green area	1.17	1.12
Butler County	1.32	1.27

The new maximum charges for these areas in Kentucky may be charged any purchaser who agreed on or prior to June 1, 1943, to pay a price determined in accordance with the disposition of a petition filed with OPA.

These increases are provided in Amendment 118 to Revised Price Schedule 88.

Navy Seeking Officers as Oil Terminal Supervisors

Naval procurement offices in various parts of the country this week were seeking candidates for commissions who can qualify in connection with a special program for oil-terminal supervisors.

Assignments will be both within and beyond the continental limits of the United States in handling of all types of fuel including the loading and discharge of tankers, tank cars and barges and the supervision of storage facilities.

Applicants must have at least 5 years' experience in the handling of bulk fuel oil and at least 2 years' experience in a water-terminal storage plant in a supervisory capacity. Inland-terminal experience unless accompanied by experience at a water terminal is not acceptable. At least 2 years of college education is desirable but outstanding business progress and experience will be given consideration. It is also desirable for candidates to have a knowledge of specifications for gasoline, fuel oil, lubricants and aircraft-engine oil.

Applications are being accepted at all offices of naval officer procurement.

Ickes Explains Need for Reducing Gasoline Use

(Continued from Page 36)

plicate the situation.

"Modern refinery operations are quite flexible. Subject to the limitations of his equipment and the kind and quality of crude oil that he uses, the refiner can adjust his yields rather widely.

"Every possible advantage is being taken of this flexibility in order to make the maximum amount of 100-octane aviation gasoline and other petroleum war products from each 42-gal. barrel of raw petroleum. The result, obviously, is that our refineries no longer can produce as much of some of the other products as they did in peacetime.

"The squeeze by these two factors —the demand for war products at the top and the demand for fuel oil at the bottom — adds up to only one thing: we are today producing considerably less automotive gasoline than we did before the war.

"In both 1940 and 1941, for example, about 37 per cent of each 42-gal. barrel of crude oil was manufactured into automotive gasoline for civilian consumption. In 1942 the yield was reduced to about 31 per cent. Today only 25 per cent of each barrel of crude emerges from the refinery in the form of civilian motor fuel.

Administrator's Conclusions

"All of this adds up to some reasonably obvious conclusions:

"1. We now have sufficient transportation to supply the eastern states with more gasoline than they have been getting.

"2. IF there were an unlimited crude-oil supply, it might be possible to leave civilian gasoline consumption in the Middle West and Southwest at the present levels, and still furnish more to the east. BUT:

"3. In the face of present and impending limits to crude-oil availability, and in the face of an increasing military demand, the only way that the wartime oil load can be borne fairly is to take more of the petroleum products out of the Middle West and Southwest instead of continuing to take a disproportionate share out of the East."

At other meetings in the Middle West last week, Administrator Ickes was criticized along with the Office of Price Administration and other government agencies. Several oil men testified before the informal committee at Kansas City, Mo., August 3 and 4. John C. Day, Tulsa, secretary of the Western Petroleum Refiners Association, blamed the dwindling crude-oil supplies on Washington "dilly-dallying." He said the only way to restore production capacities was by the price incentive.

The nation, Mr. Day added, has about 1,000,000 bbl. a day of unused refinery capacity, which it could put to work if it had the crude oil.

Present requirements, he said, are 30,000 bbl. of oil a day additional in Kansas, Missouri, and Oklahoma, while refinery capacities could handle 38,000 additional barrels if the crude were available.

Kyle D. Williams, representing Gov. Forrest C. Donnell of Missouri, said the governor concurred in the demand of Midwest governors that gasoline-ration cuts be postponed until a showing could be made of the effects on the war effort.

Dan Howard, representing the Oklahoma governor, told the committee "any further reduction in gasoline rations would seriously hamper the war effort," and that buses were overloaded to the danger point now. Oklahoma's highway use of gasoline has declined 35.7 per cent in the first 5 months this year over last, he added, while military demands had increased 365 per cent.

Gulf Buys 14 Wells in Gregg County, Texas

HOUSTON, Tex.—Fourteen producing wells in the Lathrop district of Gregg County, Texas, southwest of Longview, were purchased last week by Gulf Oil Corp. for a reported price of $1,400,000. The properties were owned by Fred L. Adams and George W. Lyles, and were on the Taylor Anderson lease in the western part of the John Ruddle Survey.

Supply Section Formed In Materials Division

WASHINGTON, D. C.—A new section has been established in the Materials Division of the Petroleum Administration for War to deal with problems of oil equipment manufacturers and shelf goods for supply companies. The new unit is in charge of Alvin Zwerneman, formerly with the Axelson Manufacturing Co. of California.

Buchanan Given Broader Powers in District 3

WASHINGTON, D. C.—D. E. Buchanan, director in charge of District 3, Petroleum Administration for War, at Houston, Tex., has been assigned wide powers over drilling and production problems by Deputy Petroleum Administrator Ralph K. Davies.

Mr. Davies, in a move designed to expedite action on production problems in District 3 and at the same time to permit greater local control over operations, ordered a new decentralized organization for the district. This order followed similar moves in Districts 5 and 2.

Principal powers assigned to Mr. Buchanan under the new order will be to grant exceptions to PAO 11, regulating well-spacing and establishing rules for securing materials for exploration and development. With only minor exceptions, Mr. Buchanan

D. E. BUCHANAN

and his staff will be able to act on requests for exceptions to the order without deference to Washington.

He is given authority to grant exceptions to well-spacing distances, definitions of wildcat wells, deepening of oil or dry gas wells, reworking wells, authorizing dual completions, directional drilling and drilling in piercement dome fields. Certain powers over condensate and gas wells, however, are still reserved for the administrator because of the complex problems involved.

Mr. Buchanan is also empowered to grant exceptions or amend exceptions to regulations governing the installation or extension of oil or gas gathering lines where the material for the extension does not exceed $5,000. Likewise, he is given power to approve use of materials for capital additions where the cost does not exceed $5,000.

PAW Liberalizes Rule on Sales of Asphalt

WASHINGTON, D. C.—The Petroleum Administration for War has amended Directive 66, governing the manufacture and sale of asphalt, to permit the sale of asphalt meeting the Oliensis spot test provided it is to be used only for surfacing airport runways. Except for this amendment the directive restricts sales of asphalt to grades meeting federal specifications.

Compacters to Concentrate On Natural Gas Problems

TOPEKA, Kans. — New developments in the use of natural gas will highlight the discussion at the Santa Fe, N. M., meeting of the Interstate Oil Compact Commission, September 24-25, according to Gov. Andrew Schoeppel, compact chairman.

Governors of 21 oil-producing states have been asked to send representatives to the meeting, which will concentrate on postwar gas processes. Slated for discussion is a method to produce 3¼ to 3½ gal. of gasoline from every 1,000 ft. of natural gas.

Production Operators Authorized To Use AA-2X Priority Rating

WASHINGTON, D. C.—Preference Rating Order P-98-b, under which the petroleum industry secures priorities assistance in obtaining materials, was amended August 9, effecting two important changes.

1. Production operators are authorized to use a Preference Rating of AA-2X in obtaining materials (other than MRO materials) for production operations.

2. It is no longer necessary for any petroleum operator, regardless of which branch of the industry is concerned, to place both a preference rating and an allotment number on delivery orders.

Experience has shown, it was said by PAW spokesmen, that delivery orders for many manufactured products needed in production operations must be filed much earlier, sometimes months, than the time provided for filing applications for allotments of controlled materials. Such items (other than MRO materials) have therefore required special applications on Form WPB-2565 for a preference rating assignment, in advance of the regular application for controlled materials allotment.

Since the preference rating structure under the Controlled Materials Plan has been fairly well stabilized, it is now possible to eliminate the special application for a preference rating and authorize the regular use of the AA-2X rating for such delivery orders.

By providing an automatic rating of AA-2X in P-98-b, the need for filing WPB-2565 applications is eliminated in the following instances:

1. Production operators who do not require controlled materials need not file such applications.

2. Production operators who require capital equipment in advance of the time an application is filed for an allotment of controlled materials, need not file a special application in advance of such time, since the automatic preference rating is available to them to secure such capital items.

3. Production operators who are able to project their operations into a calendar quarter beyond the one for which they have filed an application for controlled materials, need no longer file an application to secure a preference rating for capital items for use in such future calendar quarters.

Under the original terms of CMP Regulation 3, delivery orders carrying both a preference rating and an allotment number for controlled materials, had a higher preference than delivery orders carrying only a preference rating. With the revision of CMP Regulation 3, this is no longer true. Therefore petroleum operators need no longer put both the prefer-

ence rating and the allotment number on their delivery orders, but may now use only the one which is appropriate.

These two changes in procedure will result in the elimination of considerable paper work on the part of both the petroleum operators and PAW.

Complete Text of P-98-b Amendment

Production, Transportation, Refining and Marketing of Petroleum. Amendment 1 to Preference Rating Order P-98-b, as amended July 9, 1943.

Section 1041.2 is hereby amended in the following respects:

1. Subparagraph (d)(2) is amended by the substitution of the word "or" for the word "and" in the second line.

2. Subparagraphs (f)(1) and (f)(2) are amended to read as follows:

(f Method of Securing Material for Production Operations.

(1) Authorization of Preference aRting.

(i) To secure delivery of any material (other than MRO material) requiring the use of a preference rating, which material is for production operation, an operator is hereby authorized to use a preference rating of AA-2X.

(ii) Subject to the applicable provisions of Petroleum Administrative Order 11, as amended and supplemented from time to time, an operator is hereby authorized to place an order with a supplier for delivery of material requiring the use of a preference rating, which material is for a production operation, only where the delivery order covering any such material is placed in accordance with the provisions of subparagraphs (f)(4) and (f)(5) of this order.

(2) Allotment of Controlled Materials.

(i) Any domestic operator, who during the year 1942 drilled 40,000 ft. of hole or more, may apply for authority to obtain delivery of any material (other than MRO material) requiring the use of an allotment number, which material is for a production operation, only by submitting to the District Office of the Petroleum Administration for War in the District where the material is to be used Form WPB-2565 (formerly PD-873) at least 4 months prior to the calendar-quarter in which such material is to be delivered. Notwithstanding this provision, any such operator may request interim assistance to obtain additional quantities of such material for a production operation, or any domestic operator who during the year 1942 drilled less than 40,000 ft. of hole, may apply for authority to obtain delivery of any material (other than MRO material) requiring the use of an allotment number for a production operation, only by submitting to the district office of the Petroleum Administration for War in the district where the material is to be used Form WPB-2565 (formerly PD-873) not less than 1 month prior to the time the operator proposes to initiate or to obtain delivery of such material for such production operation.

(ii) Any Canadian operator may apply for authority to obtain delivery of any material (other than MRO material) requiring the use of an allotment number, which material is for a production operation, only by submitting to the Office of Oil Controller of the Dominion of Canada Form WPB-2565 (formerly PD-873) not less than 1 month prior to the time the operator proposes to initiate or to obtain delivery of such material for such production operation.

(iii) Submission of Form WPB-2565 (formerly PD-873) to the Petroleum Administration for War or the Office of Oil Controller shall constitute an application for an allotment of controlled materials, an application for an allotment number, and, subject to the applicable provisions of Petroleum Administrative Order 11, as amended and supplemented from time to time, an application for authority to use an allotment number to secure delivery of material necessary for the production operation(s) specified on such form. The Petroleum Administration for War or the Office of Oil Controller may thereafter make an allotment and authorize the use of an allotment number to secure delivery of material necessary for the production operation(s) specified on such form. Such allotment and authorization will be made on Form WPB-2565 (formerly PD-873).

(3) An operator may use an allotment number which he may have been authorized to use by placing it upon the delivery order for controlled materials to be used in the production operation(s) specified on Form WPB-2565 (formerly PD-873) and by certifying the delivery order as provided in paragraph (1). An operator may use the preference rating authorized by subparagraph (f)(1)(i) by placing it upon any delivery order for material requiring the use of a preference rating and by certifying the delivery order as provided in paragraph (1).

3. Subparagraph (f)(5) is hereby renumbered (f)(4) and is amended by the substitution of the word "or" for the word "and" in the third line.

4. Subparagraph (f)(6) is hereby renumbered (f)(5) and is amended by the substitution of the reference (f)(4)(ii) for the reference (f)(5)(ii) in the third line.

5. Subparagraph (f)(7) is hereby renumbered (f)(6) and is amended by the substitution of the word "or" for the word "and" in the second line.

6. Subparagraphs (j)(1) and (j)(2) are amended to read as follows:

j) Placement of Delivery Orders: Application of Preference Ratings.

(1) An operator who has complied with the provisions of paragraph (d), (e), (f), or (h) of this order may place a delivery order with any supplier for delivery of material authorized pursuant to such paragraph and may place upon such delivery order the allotment number or symbol or preference rating which has been duly authorized in accordance with the provisions of this order. The allotment symbo MRO-P-98-b shall constitute an allotment symbol for the purpose of CMP Regulation No. 3.

7. Subparagraphs (j)(3) and (j)(4) are hereby renumbered (j)(2) and (j)(3), respectively.

Issued this 9th day of August, 1943.

DEATHS

George O. Moody, 63, vice president in charge of production for Mid-Continent Petroleum Corp., Tulsa, died in his sleep August 10. He had undergone a serious operation several weeks ago and was convalescing at the home of his brother, Nelson K. Moody, at the time of his death. Mr. Moody had spent his entire life in the oil business, beginning his career with Carter Oil Co. at Sistersville, W. Va. In 1905 he came to Oklahoma for Standard Oil Co. of New Jersey. The year following he went to the oil fields of Rumania for 4 years, then spent an additional 4 years in the Dutch East Indies. He joined Mid-Continent Petroleum Corp. in 1916 as production superintendent, and 5 years later was elected vice president and director. He was senior executive of the company in Tulsa, in point of service. In addition to his brother Nelson K., who is president of Sinclair Prairie Oil Marketing Co., he is survived by another brother, Robert M., vice president of the National Bank of Tulsa.

Wilber Ford Worley, 64, office manager for Flint Hills Oil & Gas Co., Wichita, Kans., died at his home in that city August 5.

Alex Chitwood, land man for Magnolia Petroleum Co. at San Antonio, Tex., died there last week from snakebite. He was working on his ranch a short distance from San Antonio when bitten.

George H. Ritchey, 40, died last week at the home of his sister in Columbus, Ohio. He formerly was technical oil instructor for the Ohio Oil Co. at Camp Lee, Maryland.

William F. Cutting, 55, who had been an employe of Barnsdall Oil Co., Tulsa, for more than 31 years, died at his home in Tulsa August 7, following an illness of 2 months. Mr. Cutting joined Barnsdall in Bradford, Pa., and came to Tulsa 15 years ago. He worked in the field for 5 years but for the past 10 years was in the accounting department.

Conrad Newton Lauer, 73, chairman of the board of Philadelphia Gas Works Co., Philadelphia, Pa., died at his home in Pennlyn, Pa. He became chairman of the board about a year ago after resigning as president because of poor health.

Ben Whitlock, 60, serviceman for United Gas Corp., Houston, Tex., for 31 years, was stricken fatally with a heart attack last week.

Everett Mason, 35, oil worker of Crowell, Tex., died last week from injuries received when a section of tubing fell and struck him on the head a few hours before. The accident occurred on a Texas Co. well 20 miles from Crowell.

William Biggs, 37, a member of the engineering department of United Gas Corp. for 10 years, the last 1½ years at Houston, Tex., died of a heart attack last week at a hotel in Laredo, Tex.

Hughey S. Hisson, 61, Tulsa drilling contractor who assisted in bringing in some of the first productive fields in the area, died in a Tulsa hospital August 9. He had been ill since December. Mr. Hisson came to Tulsa in 1904, and worked for a time with William Elliott as an oil contractor.

Mammoth Utilities of Unusual Design Installed at Port Neches Plant

by J. P. O'Donnell

The substantial scale of the utilities involved in the operation of the new butadiene-from-petroleum plant at Port Neches, Tex., is indicative of the complexities involved in its construction. The plant, completed, will be the largest unit in the world built solely for butadiene manufacture.

THE volume of liquid charged to even a record-size butadiene plant such as that being installed by Neches Butane Products Co. at Port Neches, Tex., is small in comparison to the volume of crude oil charged by the large petroleum refineries, but the utility requirements of the former are comparable to those of the largest refineries. They are even more impressive since they are concentrated in compact units whereas the average refinery, developed over a period of years, usually added its utility sources as it expanded and they are, accordingly, distributed.

The Neches plant is a cooperative project with Gulf Oil Corp., Magnolia Petroleum Corp., Texas Co., Atlantic Refining Co. and Pure Oil Co. participating. All these companies have refineries in this area from which they will ship a butane-butylene cut to Port Neches for dehydrogenation into butadiene. Capacity of the plant will be 100,000 tons per year, sufficient to make approximately 110,000 long tons of GRS rubber which is the equivalent of almost one-fifth of this country's prewar requirements. This capacity will rank it, on completion, as the largest unit in the world built solely for the manufacture of butadiene. It was designed by and is being constructed by Lummus Co.

Tremendous volumes of steam, gas and water will be required for the operation of the plant. For example, the volume of cooling water to be taken from the Neches River, 310,000,000 gal. per day, is equivalent to one-third of the average water consumption of New York City last year, 907,000,000 gal. per day. The steam which will be generated would be sufficient, on a B.t.u. output basis, to drive 41.4 of the average large passenger locomotives used by eastern railroads. It would take ¾ mile of these 96-ft. locomotives to equal the output of the boiler plant. When operating at normal capacity, the plant will require utilities on the following scale:

Steam, lb. per hr.	2,353,290
Gas, cu. ft. per hr.	3,200,000
Cooling water, gal. per hr.	12,900,000
Electric power, kva.	1,000

Steam will be generated in four boilers, designed to produce 500 lb. steam, at the rate of 525,000 lb. per hour for each boiler. Saturated steam at 450 lb. gage will be delivered to pump and compressor drives.

Battery of reactors included in the north unit of plant

Aerial view of main boiler plant during course of construction

All boilers are gas fired and one is capable of handling a combination of gas and oil to enable the disposal of any slop oil that may be accumulated in the plant. Each is equipped with ten 24½-in. forced-draft, circulator, register-type burners. The one capable of handling oil also has four oil burners installed along with the 10 gas burners. Oil is fed by a rotary fuel pump with a capacity of 10,500 lb. per hour of Bunker C fuel oil at a discharge pressure of 300 lb. per sq. in. In all other respects the boilers are identical. They have 50,179 sq. ft. of surface or a total of 200,716 sq. ft. for the four. Each boiler has two drums, one forced-draft fan with a capacity of 650,000 lb. of air per hour, one induced-draft fan, one air preheater, with a capacity of 20,300 sq. ft., and four Dialoy soot blowers. The boiler tubes are 2½ in. and 3¼ in. in diameter.

Treated water is fed to the boilers through eight Ingersoll-Rand type No. 5, HMT, four-stage, horizontally split, diffuser-type centrifugal pumps. These pumps have a normal capacity of 500,000 lb. per hour at 650 lb. discharge pressure. They are driven by eight type DOR, 125 G.E. single-stage turbines. The turbines have a throttle pressure of 450 lb. of saturated steam, exhausting at 160 lb. These pumps also supply feed water to the waste-heat boilers in the process area.

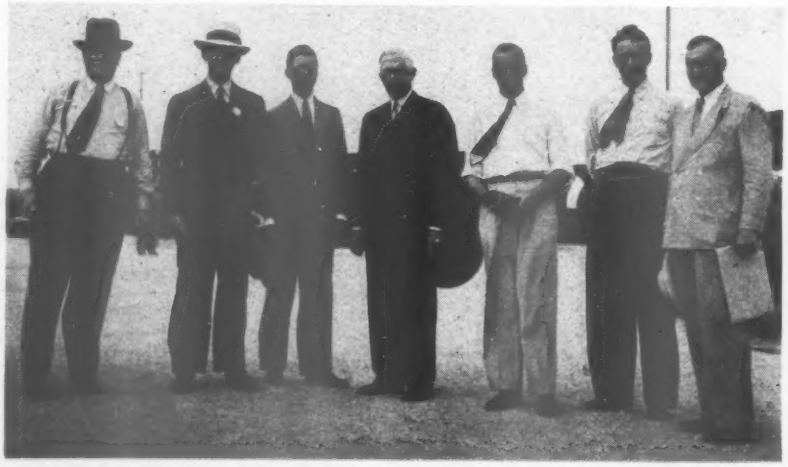
The boilers are equipped with Milton Roy phosphate feeding pumps to add anhydrous disodium phosphate and sodium sulfite to the treated water in the boilers. Capacity of these pumps is 6.5 gal. per hour. Each boiler has a pump, tank and mixer. The chemicals are added at the rate of 1 lb. to every 400,000 lb. steam generated.

The boiler plant, which has been dscribed as the largest in Texas, has two radial brick chimneys which rise 85 ft. above the foundations and have a maximum outside diameter of 16 ft. 7¾ in. Other auxiliary equipment includes one 36-in. by 11-ft. by 6-in. boiler blowdown tank, one 15 by 18-ft. fuel-oil tank, the control house and the compressor house. The compressor house contains a 975-cu.-ft.-per-minute 125-lb. discharge pressure air plant compressor to be used for cleaning tubes and general process-area requirements. It also houses the two instrument air compressors which have a capacity of 89 cu. ft. per minute and a discharge pressure of 80 lb. to supply air for the boiler-plant instruments.

Control House

The control house contains all the instruments and controls necessary for the operation of the boiler plant. Safety valves, relief valves, automatic feed water and combustion controls, etc., were installed wherever they were required for safe and efficient operation, but as many instruments as possible were eliminated because of equipment shortages. As a matter of fact, the entire plant from the boiler house to the purification unit was designed for the utmost simplicity to keep critical material consumption at a minimum. For example, hand-operated valves are used where hydraulic, remote-control valves would normally be installed. This is particularly true of the very large valves on the water filters and softeners. Further evidence of the effort to conserve critical material is the prolific use of steam power whereas electric power would normally be used in a number of instances. The latter was eliminated because of the material that would be involved in delivering it to the plant and in its use. Total electric-power consumption for the entire plant is expected to approximate 1,000 kva., being used substantially for lighting and operation of electric-driven instruments.

General use of steam necessitated the calculation of an involved balance. The 450-lb. steam from the boilers will be used to operate the boiler



Notable visitors during recent inspection of the plant: Rubber Director W. M. Jeffers; Under Secretary of Navy James V. Forrestal; Deputy PAW Administrator Ralph K. Davies; Vice President Herbert Henderson, Gulf Oil Corp., and Neches company board chairman; Under Secretary of War Robert P. Patterson; Assistant Deputy PAW Administrator Bruce K. Brown, and President C. S. Reed, Lummus Co., engineers and contractors on the project

feed pumps, boiler fan turbines, service water pumps, reboilers in the furfural purification plant, large turbines driving the emulsion pumps in the cold acid treating plant, and the 2,000-hp. compressors in the dehydrogenation plant. Most of these units exhaust at 160 lb. per sq. in. into the 150-lb. per sq. in. main except, of course, the steam used for reboiling. The 150-lb. steam is used to operate turbines on the instrument air compressors, refrigeration equipment turbines, the blowers and fans on the high-temperature steam superheaters, turbine-driven centrifugal pumps in the process area, fire-water pumps and the plant air compressors. In addition, some of it will be used on certain of the reboilers in the process area.

These units, in turn, exhaust at 15 lb. per sq. in and this steam is used for running some refrigeration-equipment turbines. All of the balance is used for reboiler steam to supply heat for the fractionation system in the feed-preparation-unit towers, the dehydrogenation-plant towers and the butadiene purification towers.

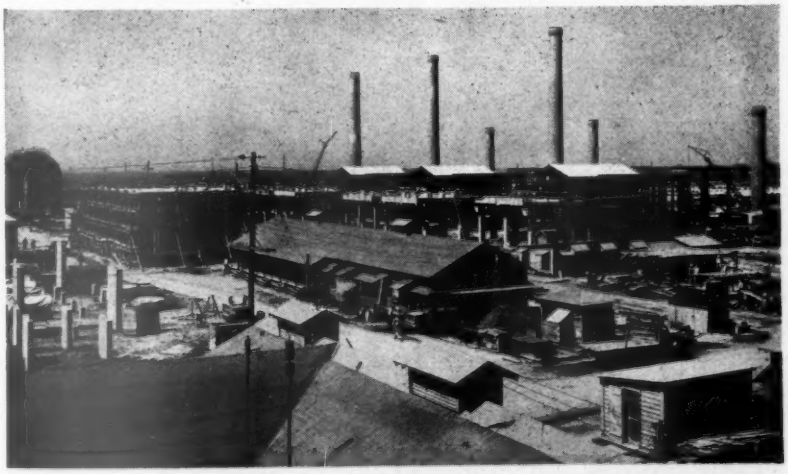
The steam is distributed through the plant in mains ranging from 16 to 24 in. The 450-lb. steam is carried in 16-in. lines, the 160-lb. in 24-in. lines and the 15-lb. in 20-in. lines. Supplementary distributing lines vary through 8, 10, 12, 14 and 16 in. Other lines include the boiler-feed-pump discharge which are 6 in. and 8 in., the condensate return, 10 in.; make-up water, 12, 14 and 16 in., and the fuel-gas line, 16 in.

Part of the boiler feed water is made up of condensate returned from the reboilers, part at 0 lb. gage and part at 80-lb. gage. This is returned to the boiler house through deaerating feed-water heaters. There are two such heaters, both of them being Worthington horizontal, double-element, double-shell type with a capacity of 1,500,000 lb. per hour each.

Aerial view of water-treating plant. Comparison with almost indiscernible figures of workmen indicate size

They are designed on the basis of handling 900,000 lb. per hour of condensate from the process area at 288° F. and 600,000 lb. per hour of zeolite treated water at 60°-90° F. They are capable of deaerating the water to less than 0.005 cc. of oxygen per liter. The heaters have a water-storage capacity of 150,000 lb. Steam inlet to the heaters is 3 to 15 lb. per sq. in. saturated.

In addition to the steam generated in the main boiler plant, under normal operating conditions 298,000 lb. per hour of 160-lb. steam is generated in the process area by use of waste-heat boilers. The heat for generating this additional steam is derived from the effluent products leaving the dehydrogenation plant reactors. There are six Babcock & Wilcox waste-heat boilers designed for 200-lb. per sq. in. pressure and will operate at 160-lb. pressure. The waste-heat boilers are the horizontal gas-tube type, each unit having 22,040 sq. ft. of heating surface. The 298,000 lb. of steam generated in the waste-heat boilers is delivered to the 150-lb. steam main in the plant process area.



Heaters under construction in south unit of west portion of butadiene plant

Treatment of Feed Water

Feed water for the boilers is purchased from Texas Public Service Co. It is treated in the clarification plant which has a design intake capacity of 7,920,000 gal. per day. From this, 7,407,000 gal. of filtered water is produced daily. Filtered water available for the processes and the water-treating plants use amounts to 1,521,000 gal. per day and 5,877,000 gal. per day of softened water is available to supply the boiler-house heaters. The total water loss in treating is expected to amount to 522,000 gal., equivalent to 6 per cent.

Principal units in the water-treating area are the filters, softeners, the filtered water and softened water reservoirs, the coagulating basin, the chemical building and the tanks for the brine and softened water. The filters, softeners and the reservoirs are all of reinforced-concrete construction. There are seven filters with 19 by 19-ft. bed and 10-ft. depth, each holding 902.5 cu. ft. of Anthrafilt, the filtering material used. The six softeners have beds measuring 19 by 9-ft. and 10-ft. depth. Amberlite, 427.5 cu. ft. per unit, is used as the softening material.

The three softened-water reservoirs measure 240 by 38 by 14.5 ft. and

Closeup of one of the boilers. The tremendous size is apparent from comparison with figures in foreground

have a combined capacity of 2,762,813 gal. They can be emptied at 4,000-g.p.m. demand in 11.5 hours and, at 6,000-g.p.m. demand in 7.68 hours. In normal operation their capacity is equivalent to 7.5 hours' supply. The filtered-water reservoir, measuring 240 by 23 by 14.5 ft., has a capacity of 55,740 gal. Each of the three coagulating basins measures 225 by 17.75 by 13.5 ft. There are two tanks, one for brine storage, 28 by 15 ft., and one for softened water used to backwash the filters. The latter measures 38.3 by 22 by 10 ft. and has a capacity of 56,723 gal. The amount of backwash water required per softener is 2,850 gal.

The chemical building is a three-story structure housing acid and alkali-mixing tanks, proportioning tanks, metering equipment, storage space, etc. Other equipment in the water-treating plant are five pumps with a capacity of 4,500 g.p.m. each with a discharge pressure of 110 lb. There are also, of course, the interconnecting piping and manifold system and the necessary instruments, small pumps, sludge cars, etc. Provision has been made in the water-treating area to add an eighth filter and a seventh softener.

Source of Cooling Water

Water for cooling is brought in from the Neches River through a mammoth conduit measuring 22 ft. in width, 9 ft. in depth which is divided into three sections so that one at a time may be closed off for cleaning if necessary. Each of the three sections has an opening 6 ft. wide and 7 ft. deep. Normal consumption will amount to 12,900,000 gal. per hour. Two low-head pumps capable of handling this volume pick up the water after it has passed through a set of revolving, self-cleaning screens to remove fish and debris and discharge it into the conduct which carries it 5,700 ft. to the plant pump station. The station has 10 centrifugal pumps which remove the water from the conduit and discharge it to the system at a pressure of 65 lb. per sq. in. The cooling-water lines are fabricated of concrete pipe and measure up to 66 in. in diameter. After use, the water leaves the process area through a 96-in. concrete line and is returned to the river through an outfall canal. The outfall canal is 19,300 ft. in length.

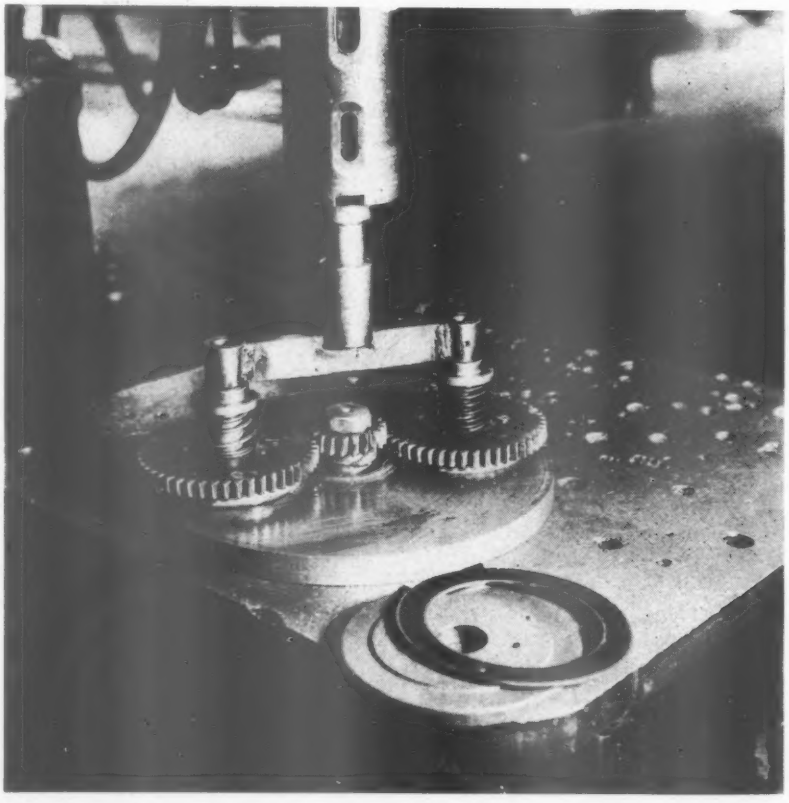
The normal gas consumption of the entire plant will be 2,870,000 cu. ft. per hour, the bulk of which is purchased natural gas though a portion, 670,000 cu. ft., will be process gas produced in the plant. The natural gas, purchased from United Gas Pipe Line Co., has a molecular weight of 17.8 and a B.t.u. content of 1,037 gross and 940 net. Under normal circumstances the boilers will consume 2,775,000 cu. ft. per hour of gas at 60° F. and atmospheric pressure.

The substantial scale of the utilities involved in the operation of this plant give a small indication of the complexities involved in its design and construction. This fact takes on additional significance when it is realized that this is merely auxiliary equipment for the even more complex processing area in which the finished butadiene will be produced.

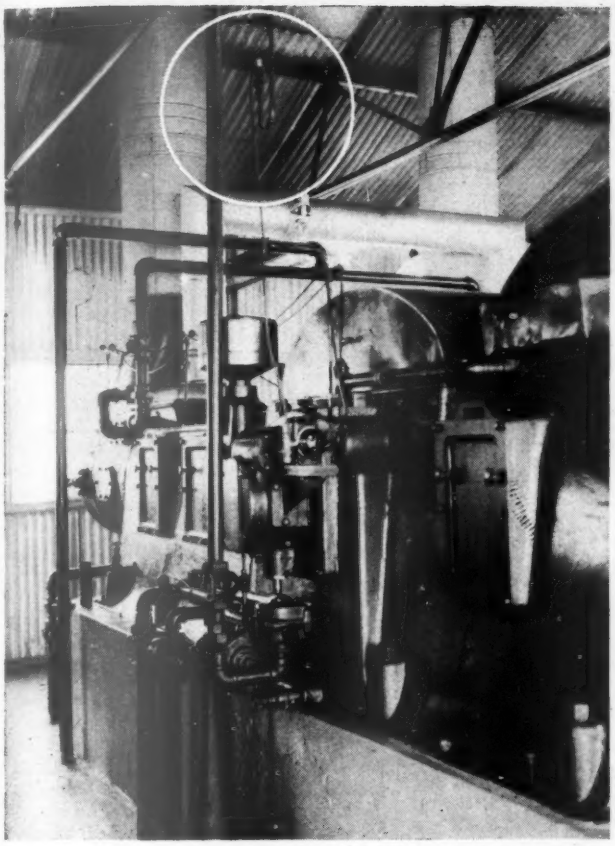
Machine for Lapping Compressor Valves

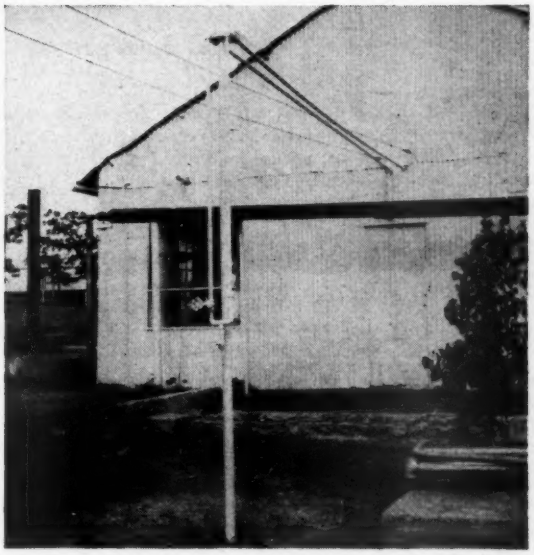
A MACHINE for lapping thin flat compressor valves, disks, flat plates, etc., was made in a Texas refinery machine shop. A thick cast-iron plate with a machine-grooved surface was bolted to the table of a drill press. Above the plate a double-arm assembly was fitted to the spindle socket, on the ends of which vertical pins are fitted. Three fiber gears are fitted, two to these vertical pins, the third meshing between them and anchored to the cast-iron plate so that as the spindle rotates the double arms rotate and also the two main gears rotate in the opposite direction, giving a double rotational motion. Flat metal valve disks or other parts are held to the underside of these two main fiber gears by short screws holding a fiber disk to which the valve disk is held by friction. The main gears are loose on the pins, forced downward by springs.

In operation, the disk, valve or otherwise, is placed on the surface of the fiber disks attached to each of the rotating gears; lapping compound is smeared on the surface of the cast-iron plate and the spindle and gear assembly lowered into contact with the abrasive-covered plate, and the machine is started. Lapping is continued until the desired surface is obtained.



PLANT PRACTICES





Emergency Shutdown for Compressor Gas Engines

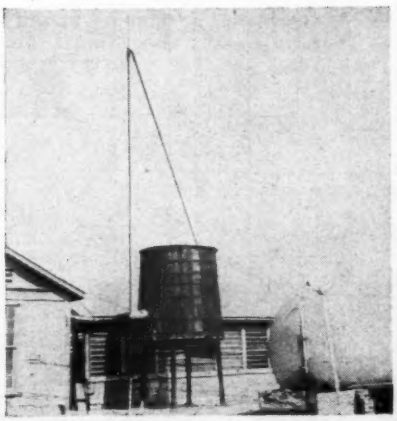
A SIMPLE, yet effective means by which the engines in a gas-compressor plant can be shut down quickly in an emergency, or for other reasons, by a remote control outside the compressor building has been devised by the operator of a gasoline plant in the Seminole field, Oklahoma.

A small-sized pipe, capable of carrying at least 150 lb. pressure, extends the length of the compressor building supported by roofing members above the engines. At each engine position, a small-sized J-shaped pipe, hanging downward above the engine, is fitted into the overhead line. In the bottom end of each of the J pipes is fitted an ordinary spark plug with an electric wire connection to the magneto of the engine which it serves. The U section of each pipe contains a small quantity of mercury, the level of which does not touch the spark-plug points.

The main overhead pipe extends outside the compressor building a desired distance and down to a connection with a 150-lb. utility gas system serving the plant and camp. In this downward line at convenient height is a small gate valve. To shut down the engines it is only necessary to open this valve, allowing the 150-lb. gas to enter the overhead line to the J tubes. The pressure forces the mercury in the U bends up to the spark plugs, and, in contact with the points, the mercury shorts the magnetoes, killing the engines. The installation includes a second and paralleling overhead line extending outside the building serving for relief of the pressure when restarting the engines. As precaution against failure in an emergency, the spark plugs are removed and inspected regularly and frequently.

Automatic Dual-Pressure Control for Water System Serves Varied Plant Uses

PRESSURE requirements for water may be considerably different for various places around a gasoline plant. Cracking a valve to give the desired back pressure may not be satisfactory as the pressure would vary with the volume of water pumped or would change if scale or other foreign matter accumulates behind the partly closed valve. Simple relief of expansion valves also would vary somewhat if the volume of liquid changed appreciably, thus resulting in a fluctuating pressure and possibly an excessive back pressure.



A simple, foolproof system for delivering water at constant pressure is shown in the accompanying picture. It consists of a joint of pipe extending in the air about 28 ft. A valve on the tank is pinched so that a large amount of the water flows through this overhead pipe at all times. The low-pressure water can flow into the coil pit and the high-pressure water is available for employes' house, power, boiler house and other general use.

Practical Refining Series—Part 10

Butane and Pentane Content Of Petroleum Products

by W. L. Nelson

ALTHOUGH the proper and ideal way to determine the light hydrocarbon content of a gas or liquid product is to analyze the material by a low-temperature or equal fractional analysis, there are numerous occasions when a quick estimate of the quantities that may be available is useful.

Physical Properties

The properties of these hydrocarbons are indicated in Table 1. Dimethyl propane is also one of the pentanes but it is usually present in such small amounts that it is not reported in analyses and therefore it is not included in the table.

Composition of Products

The compositions of various field gases and light gasoline products are by no means consistent with one another, exhibiting a wide range of composition, but in part this is due to inadequacies in the analysis methods that are available. Table 2 indicates the butane and pentane content of common materials. The amount of iso-compounds (isobutane and isopentane) is of major importance because the iso-compounds have high octane numbers or contribute to a high octane number in subsequent processing operations, and hence the ratios of isobutane to butane and isopentane to pentane are included in the table. It will be noted that the isobutane content is usually less than the butane content, whereas the amount of isopentane usually exceeds the pentane.

The wet natural gases are listed first in Table 2 because they represent most accurately the total hydrocarbons that are available—i.e., compositions that have not yet been altered by the losses (or concentration of constituents) that occur in subsequent plant processing. Next in the table are the natural gasolines (both wild and stabilized) because they should be the next best sources of determining the ratio of iso to normal pentane. The large amount of pentanes in natural gasoline would seem to make the gasoline analyses more reliable than other sources. According to Table 2, the average ratios are as follows:

	Ratio	Range
Average ratio of iso to normal butane	0.54	0.288-0.969
Average ratio of iso to normal pentane	1.096	0.236-2.30
Stated in another manner—		
Per cent isobutane in mixed butanes	31.9	22.4-49.2
Per cent isopentane in mixed pentanes	53.7	19.1-69.7

These averages were taken from the wet natural gas and the gasoline analyses.

Mixtures of Butanes or of Pentanes

The composition of mixtures of butanes containing little else or of nearly pure pentanes may be judged by some common or easily determined physical property such as specific gravity or vapor pressure. The vapor pressure and specific gravity of butane mixtures and pentane mixtures is shown in Figs. 1 and 2. Thus, a pentane mixture which has a vapor pressure of 18, would consist of about 50 per cent isopentane whereas one with a vapor pressure of 20 would consist of about 86 per cent isopentane.

Another method of determining the purity of hydrocarbon mixture are the so-called "boil away" tests. In general, these are tests whereby the

TABLE 1—Properties of Hydrocarbons*

Material—	Sp. gr. 60/60	A.P.I.	Boiling point— Deg. C.	Boiling point— Deg. F.	V.P. at 100° F. lb./sq. in. abs.
Propane	0.509	146.5	—42.1	—43.8	187
Isobutane	0.564	119.5	—11.7	10.9	73.7
Butane	0.584	111.0	—0.5	31.0	52.2
Isopentane	0.6192	97.0	27.9	82.1	20.8
Pentane	0.626	94.5	36.0	96.8	15.6

*Physical Properties of the Hydrocarbons, 3d ed., 1942, the Texas Co.

Fig. 1—Compositions of butane mixtures and pentane mixtures as a function of specific (or A.P.I.) gravity

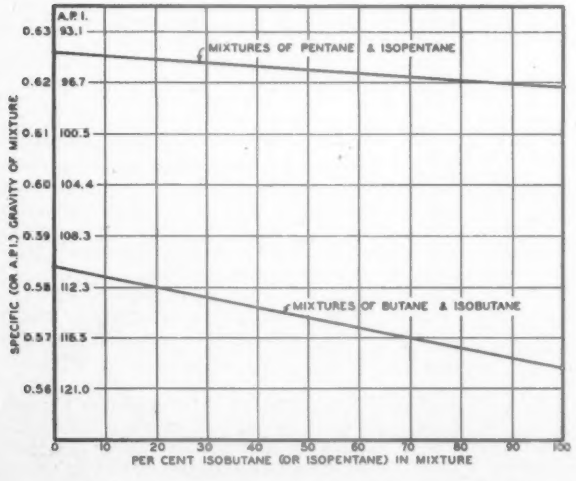
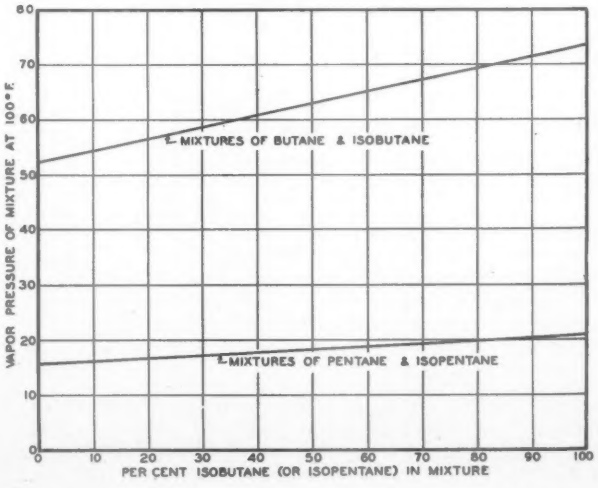


Fig. 2—Compositions of butane mixtures and pentane mixtures


VAPOR PRESSURE OF MIXTURE AT 100° F.
0 10 20 30 40 50 60 70 80
MIXTURES OF BUTANE & ISOBUTANE
MIXTURES OF PENTANE & ISOPENTANE
0 10 20 30 40 50 60 70 80 90 100
PER CENT ISOBUTANE (OR ISOPENTANE) IN MIXTURE

Good Soldiers!

This is Charlie Neilson. He and 497 other "good soldiers" in his outfit have just been decorated with Army-Navy "E" pins for distinguished service to their country. They've dropped no bombs, captured no enemy strongholds. But they've been doing other mighty important work. Over at the Coffeyville, Kansas plant of The Parkersburg Rig & Reel Co., hundreds of Charlie Neilsons have been working like beavers to turn out the war material that their comrades need at the fighting fronts.

Like the soldiers, sailors and marines who ran the Japs off Guadalcanal and Attu, Charlie, his gang and the management of the Coffeyville plant like to feel that they, too, are winning battles . . . battles of production. And they're proud of this Army-Navy recognition.

Our friends in the oil industry have a stake in our Army-Navy "E" Award too, for they have done without our products so that we, and others, could work for this nobler cause.

OCS THE COFFEYVILLE, KANSAS PLANT

THE PARKERSBURG RIG & REEL COMPANY
PARKERSBURG, WEST VIRGINIA
Dallas, Houston, Tulsa, Los Angeles, Coffeyville, New York

PARKERSBURG

TABLE 2—Composition of Light Petroleum Materials

No.	Material—	From	Percentages of iC_4H_{10}	nC_4H_{10}	iC_5H_{12}	nC_5H_{12}	Ratio of iso to normal: Butane	Ratio of iso to normal: Pentane	Reference
1	Wet natural gas	Ave. of 45	1.35	2.33	....	..	0.576	....	1
2	Wet natural gas	Kilgore field	3.02	9.33	2.06	1.36	0.324	1.515	2
3	Wet natural gas	Lea Co., N. M., composite	0.61	1.29	0.17	0.72	0.571	0.236	3
4	Wet natural gas	.....	1.30	3.03	....	....	0.43	....	4
5	Wet natural gas	Casinghead, E. Tex.	2.80	9.70	2.0	2.0	0.288	1.0	..
6	Wet natural gas	Casinghead, N. Tex.	1.92	3.68	....	....	0.522	....	..
7	Wet natural gas	East Texas	4.01	10.05	2.67	1.96	0.400	1.36	5
8	Wet natural gas	Benavides, Texas	1.37	1.57	1.13	0.49	0.873	2.30	6
9	Wet natural gas	Wabash Valley, Ill.	1.90	5.36	1.45	1.73	0.354	0.84	7
10	Distillate	525 lb. separator	3.58	5.74	6.42	3.68	0.625	1.74	1
11	Distillate	2,400 lb. separator	0.61	0.63	0.49	0.24	0.969	2.04	1
						Ave.	0.54	1.38	
12	Stable gasoline	Benavides, Tex., plant	2.67	19.17	18.80	13.27	....	1.420	6
13	Stable gasoline	Healdton, Okla.	....	7.58	15.46	23.83	....	0.649	(*)
14	Stable gasoline	Madill, Okla.	....	17.45	15.66	24.36	....	0.645	(*)
15	Stable gasoline	.....	1.02	17.55	13.67	15.06	....	0.906	1
16	Stable gasoline	.....	1.73	16.13	11.58	19.33	....	0.599	1
17	Stable gasoline	.....	4.42	24.06	13.18	18.19	....	0.725	1
18	Stable gasoline	.....	2.67	19.17	18.80	13.27	....	1.420	(*)
19	Wild gasoline	.....	8.76	29.33	....	....	0.299	....	1
20	Wild gasoline	.....	9.38	23.33	....	....	0.402	..	1
21	Wild gasoline	.....	8.81	26.95	5.54	12.24	0.316	0.452	1
22	Wild gasoline	.....	10.23	25.54	....	....	0.400	....	1
23	Wild gasoline	.....	4.74	23.71	10.43	21.19	0.200	0.493	1
						Ave.	....	0.813	
24	Dry gas	Ave. of 45 (from absorbers)	0.78	0.69	....	....	1.13	....	1
25	Dry gas	440 lb. absorber	0.36	0.47	....	....	0.765	....	1
26	Dry gas	52 lb. absorber	1.21	0.97	0.1	....	1.246	....	1
27	Dry gas	18 lb. absorber	6.0	3.0	....	....	2.000	....	1
28	Dry gas	59 lb. absorber	0.6	0.7	....	....	0.857	....	1
29	Dry gas	53 lb. absorber	1.1	0.5	....	....	2.20	....	1
30	Dry gas	60 lb. absorber	0.29	0.14	....	....	2.07	....	..
31	Dry gas	30 lb. absorber	0.61	0.15	....	....	4.06	....	..
32	Dry gas	Compressor and coolers	1.35	1.3	0.5	0.25	1.04	2.0	1
33	Dry gas	Panhandle well	0.55	1.2	0.48	0.26	0.458	1.84	(*)
34	Dry gas	South Texas well	0.41	0.47	....	....	0.87	....	..
35	Dry gas	Oklahoma pipe line	0.13	0.31	..	....	0.42	....	(*)
36	Dry gas	160 lb. separator	0.44	1.42	0.09	0.61	0.305	0.147	(*)
37	Wet refinery gas	Vapor recovery	4.44	7.77	2.76	1.51	0.571	1.83	1
38	Wet refinery gas	Raw gasoline tanks	10.86	23.16	4.29	3.02	0.470	1.42	1
39	Wet refinery gas	Crude and cr. stills	7.95	27.10	8.8	9.51	0.203	0.925	(*)
40	Wet refinery gas	Raw gase. tanks	7.25	22.13	5.45	5.53	0.328	0.965	(*)
						Ave.	0.393	1.290	
41	Crude oil	Healdton, Okla.	0.14	0.78	0.62	1.08	0.18	0.574	(*)
42	Crude oil	Fargo	0.39	1.61	1.05	1.30	0.242	0.808	(*)

*Private files of the author.

mixture is allowed to evaporate at atmospheric pressure. H. W. Harts[9] shows the following relation between end point and purity of isobutane:

Per cent isobutane—	End point
100	13.5° F.
98	14.1
96	14.7
94	15.3
90	16.5
86	17.8

A weathering test is specified by the California Natural Gasoline Association.[10] Chilled sample is permitted to vaporize until only 10 per cent remains and the temperature is recorded for this situation. Further vaporization is then permitted and upon attaining the end point, the sample is chilled. The amount of final residue and the temperature at 90 per cent evaporated are closely related to the isopentane content of a butane mixture.

Finally, the temperature at which the vapor pressure of a hydrocarbon mixture is equal to atmospheric pressure (obtained by plotting on vapor-pressure chart) is an indication of the composition of the mixture.

Vapor Pressure and Butane Content

As a gross approximation of the butane content of common light petroleum products, the butane content is approximately equal to the vapor pressure. This relationship, as well as its limitations, is indicated by the following tabulation:

	Approx. % butanes
8 lb. regular 400 E.P. gasoline	6.6
10 lb. regular 400 E.P. gasoline	10.0
12 lb. regular 400 E.P. gasoline	14.0
14 lb. natural gasoline (20 per cent evap. at 140°)	14.0
18 lb. natural gasoline (50 per cent evap. at 140°)	18.0
22 lb.—55 grade	15-24
26 lb.—70 grade	24-33
30 lb.—70 grade	33-42

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BOOK REVIEW

PETROLEUM DEVELOPMENT AND TECHNOLOGY. Transactions of the A.I.M.E. Vol. 151, 1943. 601 pp. $5.

This volume is the eighteenth of the series of the Petroleum Division of the A.I.M.E., and contains papers and discussions presented before the division at meeting helds in New York, February 9-12, 1942; Los Angeles, Calif., October 15-16, 1942, and Austin, Tex., October 29-31, 1942; also the petroleum statistical reports covering the year 1942.

There are six chapters, devoted to production engineering, engineering research, geophysical exploration, petroleum economics, production and refining.

Meet Joe*—the guy who'll handle Wheland Rigs in 194X

You know Joe, of course. You've seen his picture in the magazines, read about him in the papers, heard about him on the radio. He's the guy who broke the Mareth line in Africa, who chased the slant-eyed Japs out of the cocoanut groves on Guadalcanal.

We know him, too. He's the guy who operated Wheland equipment before the war. He's been to army technical school—he knows the "why" as well as the "how" of machinery. We know he's going to be a tough customer to please when again—in 194x—he's a tool pusher, driller, or crew member. That's why we have this message for him—

"Go ahead, Joe. Make the Jap-Axis remember what Sherman said about war. We're going to back you to the limit, by buying more and more War Bonds, and then some more. And when Victory comes, we're going to give you better rotary equipment than ever before. You know what we mean, Joe. Equipment like the 90 MM gun we're making for you today."

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THE WHELAND COMPANY

ROTARY DRILLING EQUIPMENT

Chattanooga, Tenn.

Coin Your Ideas—

Prize Winners Contribute To Refinery Efficiency

INAUGURATED in 1918, the Standard Oil Co. (New Jersey) "Coin Your Ideas" plan has resulted in many suggestions which have yielded substantial savings to the company and also substantial awards to the originators. The plan includes subsidiary and affiliated companies and this year the two highest capital awards of $500 and $300, respectively, were won by employes of Standard Oil Co. of Louisiana.

The first capital award went to A. W. Jones in connection with a method of repressuring reflux accumulators on the alkylation plant with natural gas. In the operation of a given tower, a minimum temperature of the overhead product is desired. This was accomplished by the existing condensers but the operation resulted in such a low pressure on the overhead reflux accumulator that the product-pump capacity was decreased to an inoperable point. To permit running a cold product, and retain product-pump capacity, Mr. Jones suggested installing a natural-gas bleed-in ahead of an existing pressure-release valve connected to the vapor space of the overhead product drum (A in Fig. 1).

A. W. JONES

J. C. BECKWITH

Who submitted suggestions for which Standard Oil Co. of Louisiana paid them $700 and $400 respectively. Their suggestions are described in the accompanying article

This gas travels in two directions, namely, a portion is absorbed in the butane product while a second portion passes through the release valve. Thus the desired drum pressure is maintained while still holding the product at a minimum temperature.

Automatic Control Valves

The second capital award was given to J. C. Beckwith for his suggestion in connection with the installation of automatic control valves on the steam-condensate line from reboilers, preheaters, etc., rather than on the steam-inlet line.

Several reboilers on distillation towers were utilizing as a heating medium exhaust steam available at 15 lb. per sq. in. pressure. In some cases, the loss of pressure through the valve controlling the steam rate to the reboiler reduced the temperature of the condensing steam to a point where operations were difficult, as the temperature difference between the vaporizing oil and the condensing steam was small. In other cases, the temperature required on the oil was so low that the steam condensed at 0 lb. per sq. in. gage pressure or less and expensive pumping traps were required to remove the condensate.

Mr. Beckwith's suggestion entailed the installation of the steam-control valve on the condensate outlet from the reboilers (Fig. 2) with the result that full steam-line pressure is imposed on the reboiler tubes at all times. The savings are twofold, because the control valve (and attendant cocks and valves) are reduced in size (from 15 in. to 3 in. in one case) and no trap is required.

The net change in control was from a variable steam pressure in the reboiler with all of the tubes exposed, which made the temperature difference the control-factor variable, to a constant steam pressure with a variable condensate level which makes the area of the tubes exposed the control variable.

In addition to the New Jersey company capital awards, Messrs. Jones and Beckwith also received awards of $200 and $100 from the Louisiana company for their suggestions.

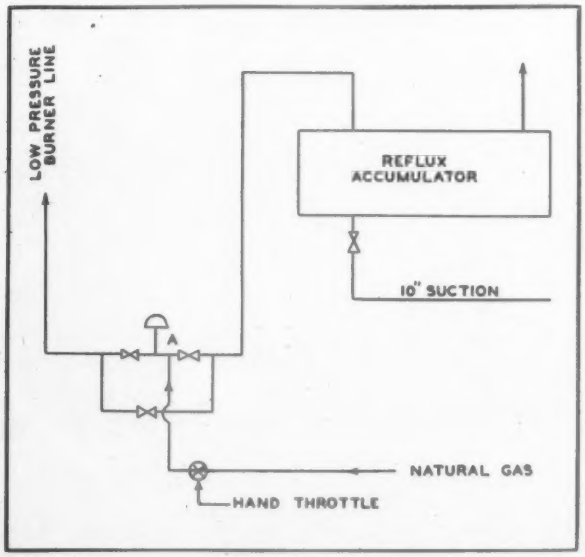


Fig. 1

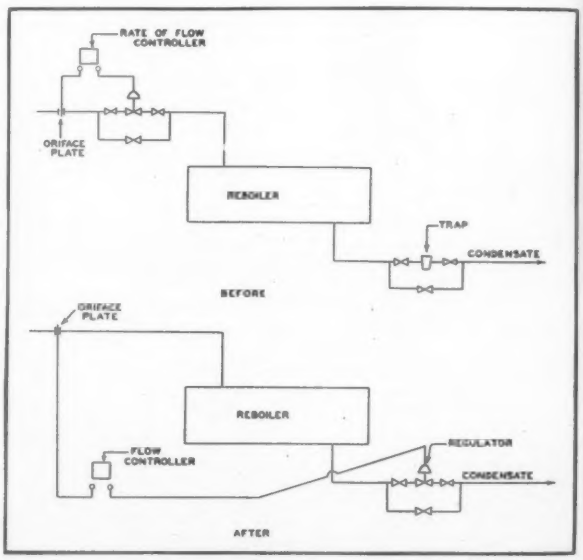
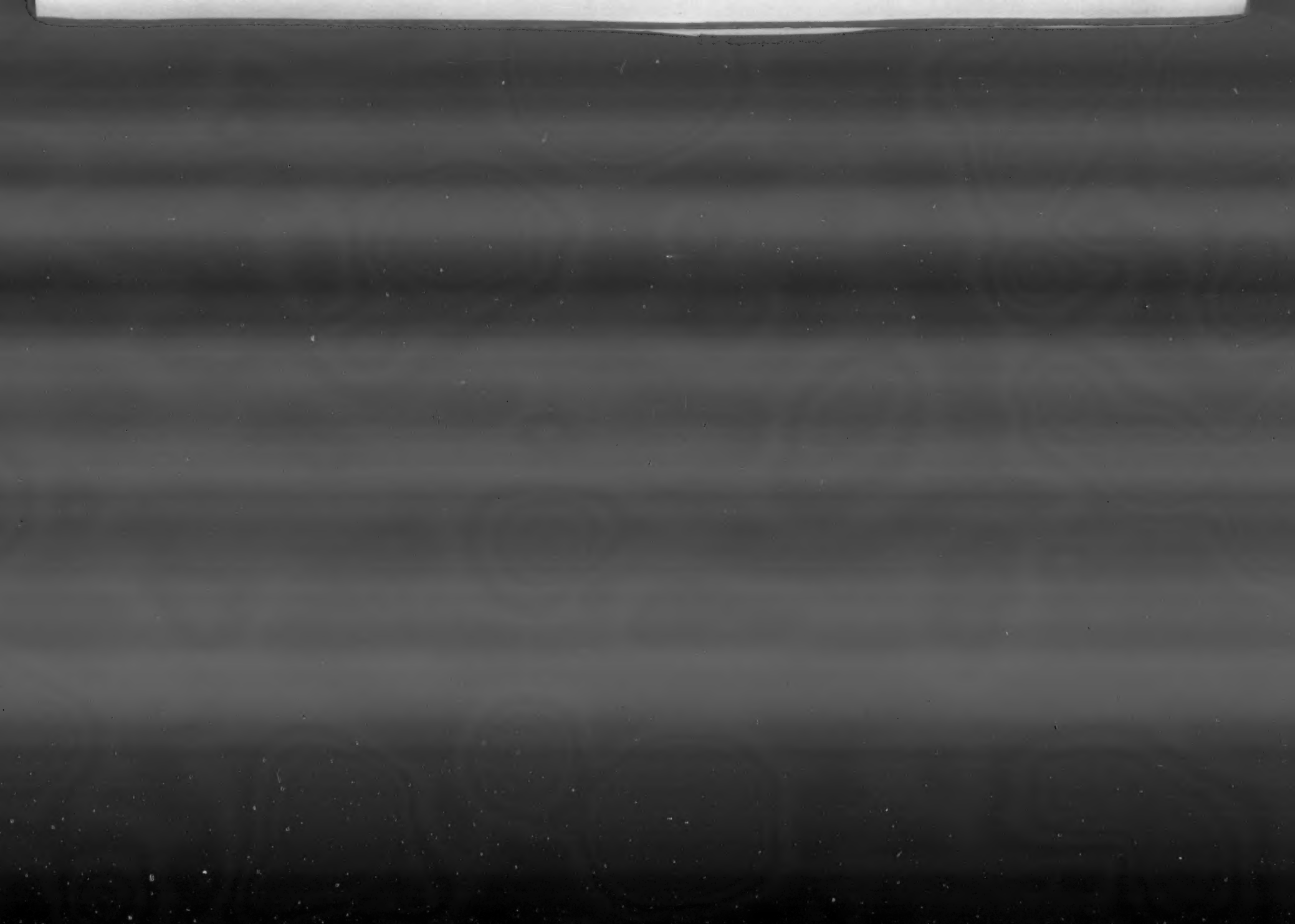


Fig. 2



CEMENTING TROUBLES

Start During Drilling

by Harry F. Simons

Many causes of failure of the cement placed behind the casing to perform its proper functions are either created or are present during the drilling of a well. The principal obstacle to a satisfactory job is the enlargement of the hole and it may be that drilling holes to gage will be as important in the next 10 years as straight-hole drilling has been during the past decade.

This article deals with the origin of many cementing failures. No attempt has been made to describe equipment and methods used in cementing oil wells or to detail the characteristics of the various types of cement available. No calculations are presented because those involved have only to do with volumes.

DESPITE all the advances in cementing technique and equipment during the past 20 years, failures which endanger producing wells are quite common. Repair of casing leaks which occur either around the casing seat or in the body of the pipe is both tedious and expensive and often quite exasperating.

Obviously, methods, equipment, material and techniques used for cementing casing in a well are still being improved and they are quite distant from the ultimate perfection which will still not have been reached when the last well is drilled for oil. However, if properly used, present equipment and cement will result in a job which will provide protection and support for the casing throughout the life of the well or, in case of failure, they can be used for repair at a reasonable cost.

No tool, material, equipment or method will ever provide a cure-all for cementing troubles; the best that can be expected for any advancement or improvement is a contribution to solving the problem which, when properly used, will increase the probabilities of getting the desired results.

On of the greatest obstacles to solving the cementing problem is the fact that a poor cement job at completion time, unless it is a badly leaking casing seat or the failure to shut off the zone immediately above a horizon to be perforated, is just as nice appearing and as satisfactory as a good one. The casing is in the hole, the cement slurry has been pumped down the inside of the pipe and up the outside, no gas or fluid is escaping through the braden head. A week, a month, a year or 10 years may elapse before the results of a poor cement job begin to appear. The net result is that actual research on cementing problems lags and much of the burden is left on the shoulders of cement and equipment manufacturers until a particular oil company suddenly has a number of wells go off production because of casing leaks. If it happened to be impossible to get the cement in the hole in any manner other than a satisfactory one, the problem would be an immediately important one and would be treated accordingly.

Most present-day cementing troubles and problems are due to conditions in the hole rather than to poor material and equipment; a contributing factor is the failure to utilize properly the available tools. Another cause of trouble is the desire to reduce the well investment by saving on either equipment or material used for cementing.

As most of the troubles and problems are due to conditions in the hole, these conditions are either created, or at least they can be ascertained, while drilling is in progress or before the casing is run in the hole. After the casing has been run, there are other checks which will give indication of how successful the original job was and if any additional cementing work is required.

The greatest single bar to a successful cementing job, according to one major oil company engineer who has been in charge of cementing over a thousand wells, is the fact that few bore holes are drilled to gage. A 7¾-in. bit may be run in the well and all the engineer is sure of is that the hole is at least that large. How much larger it is, he doesn't know.

In cementing any well, the amount of cement used is determined by how high it is necessary for the cement to rise behind the casing and the diameter of the hole. The height desired may be merely a few hundred feet, to a point above a certain formation, into the intermediate string of casing or the surface pipe, or to the surface. Conditions in the hole from which the casing must be protected may include salt or acidic-water-bearing formations soluble electrolyte-forming formations, oil and gas productive sections, sour-gas sections, thief zones and cavey formations. The mud in the hole may be corrosive or it may an electrolyte and hence must be displaced.

For the engineer or production superintendent to determine how much cement is required to fill the annular

Fastening hose to cementing head preparatory to circulating mud and placing cement around oil string of casing in medium-depth well drilled with rotary rig

space to any certain point is like asking how much water it will take to fill 1,000 ft. of pipe of unspecified diameter.

There is a tool and a method available which will give some indication as to the hole diameter throughout its length. The most positive means for measuring cavities which are not too large, is the hole caliper, a set of fingers which ride on the wall of the hole while their position (and the diameter of the hole) is recorded at the surface. This tool has other uses but it is a major contribution to successful completion of a well when it measures the diameter of the hole. With it the engineer can have available the dimensions necessary for computing volume.

The method for determining whether the hole has cavities is to use a telltale in the mud, either a dye, easily identified chemical or a solid having the approximate density of the mud. The time required for the telltale to make a trip down the drill pipe and up the annulus gives some indication of the volume of the hole. It will not show the extent of large cavities as the mud stream follows the drill pipe and has a diminishing effect as the distance from the drill pipe increases. The telltale also will not show the location of the cavities.

A cavity 8 ft. in diameter would require 125 to 150 times as much cement slurry to fill it as the average annular space between a hole drilled to gage and the casing. Only a few feet of cavity of such diameter is required to use up the cement allotted to the well. Equally as bad is the enlargement of the hole diameter of only a few inches extending over several hundred feet vertically. Both phenomena are more common than many believe.

Causes of Cavitation

Causes of the cavitation include solution of part of the formation material, hydraulic effect of the drilling fluid and mechanical action of the drill pipe. In any of the several areas of the United States where salt sections are commonly drilled, the use of a drilling fluid containing an excess of water will cause a cavity to develop and it is in such wells that protection of the casing throughout its length, or at least to above the salt section is an absolute necessity. This is a case where the cause of the trouble is also the cause of the condition which prevents its cure. The amount of salt, or any soluble material, which is dissolved will depend on the amount of free water in the drilling fluid. To prevent dissolution of such formations a special drilling mud must be employed. Such mud is available. In some cases, considerable success has been had by using a special mud for drilling the soluble sections and then changing to a good colloidal mud with a low water loss for drilling the remainder of the hole. The filter cake deposited on the wall through the soluble section by the special mud protects it. Where soluble sections are known to be present, careful supervision to maintain a low-water-loss fluid is essential if cavities are to be prevented.

The jets in the ordinary rock bit forces the fluid downward and outward so the wall of the hole is bombarded with a stream of mud. This bombardment results in the disintegration of a soft or incompetent formation and a cavity develops. The effective hydraulic action on the wall of a hole is reduced as the diameter increases and consequently such cavities are not as large as those produced by solution. Some think it advisable to slow down the pump while drilling unusually soft formations and other engineers are quite emphatic about not running the pump at maximum speed while the bit is off bottom because if the bit is opposite a soft formation the chances of erosion are great. The contention is to drill rather than pump out the formation, which is contrary to the opinion of the average driller.

Mechanical enlargement of the hole is due mainly to attempting to run too much weight on the bit which results in the bending or kinking of the drill pipe at some upper point in the drill string. If rotation is at high speed the kink in the pipe contacts with the wall of the hole frequently and with considerable force and literally whips out a cavity at that point. A crooked drill collar could cause an enlarged hole while drilling through a soft formation but cavities from this cause are probably few.

The prevention of enlarged holes from drill-pipe whip is obviously to not run any weight in excess of the drill collars, or, if that is necessary, to choose the point of maximum bending with care and at least try to get it opposite a formation which can reasonably resist the pounding. On several occasions, one engineer reduced the amount of cavings being carried by the mud stream by this simple expedient. The amount of cavitation in the wall of the hole is to a certain extent indicated by the amount of cavings brought up by the mud.

There are all degrees and combinations of the above. In addition to true solution, for instance, there is the disintegrating effect of water on many formations which cause them to cave or slough into the hole.

Indications of Cavities

Necessity of pumping out cavings while attempting to get to bottom during a trip as the well is being drilled is an indication that the hole is sloughing, particularly if it is necessary to pump through the same place on a number of successive trips. While drill cuttings will settle out, especially if a poor quality drilling fluid is being used, they will generally fall to bottom. Certainly, the settling out of cuttings cannot be credited with a bridge 50 to 100 ft. or more through. A drilling fluid with

FIG. 1

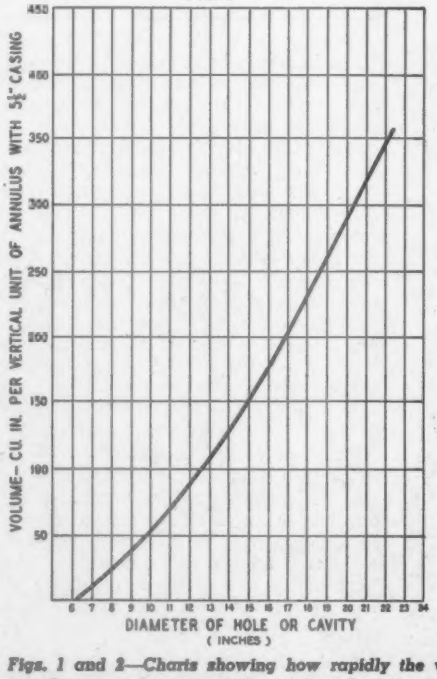
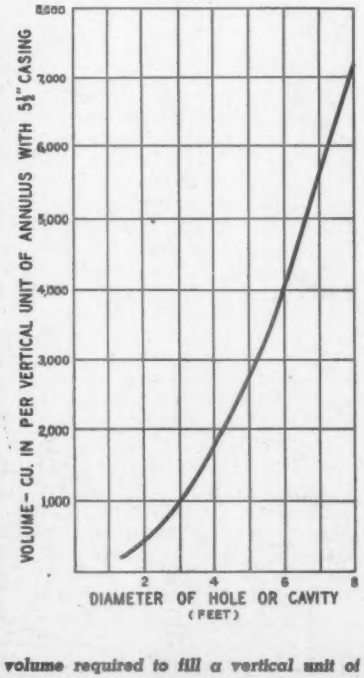


FIG. 2



Figs. 1 and 2—Charts showing how rapidly the volume required to fill a vertical unit of annular space between casing and wall of the hole increases as the hole diameter is enlarged. A single large cavity will use up all of the cement allotted to the job, leaving a large portion of the pipe unprotected

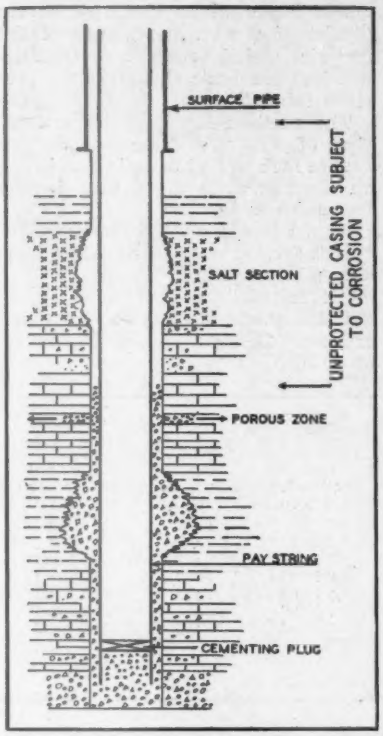


Fig. 3—Schematic drawing showing how cavities and porous zones in a well take up cement so that a portion of the casing is left exposed to corrosive influences. Even if enough cement is allowed to fill the cavity, the cement cannot rise much above the porous zone in a single-stage job

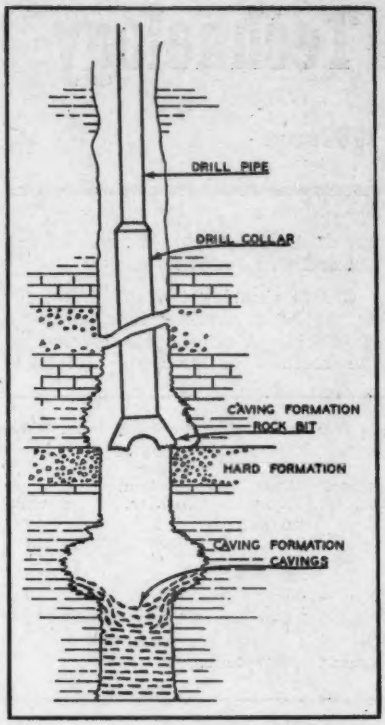


Fig. 4—Schematic drawing of two of the drilling indications of cavitation in the hole wall. The rock bit's hanging on a ledge is possible because of a cavity above. Repeated necessity for pumping through cavings indicates the hole is sloughing at some point above

a low water loss will prevent or at least reduce the caves.

Another indication of cavities in the hole is the striking of a ledge while running in the drill pipe. The driller can tell it is a ledge as the drill stem stops with a sudden jar. The action used to get off proves that it is a ledge. This consists of picking up most of the weight of the drill pipe and then turning the drill stem a part of a revolution, or several revolutions and a fraction, during which the bit drops free and can be lowered. The bit landing on the ledge is due to a fairly large cavity in which the lower portion of the drill stem is free to swing like a pendulum or it can be due to a slight kink in the drill stem, either in a drill collar or in the drill pipe.

Presence in the mud of splinters of formation already drilled through show that the formation is gradually disintegrating and the hole enlarging. Often the amount of cavings will be much more than the bit cuttings in the mud. Location of the worst cavities can be made through identification of the formations from which the cavings are coming.

Mud Forecasts Cementing Troubles

Generally, any difficulty which causes special mud treatment will later cause cementing troubles or will require consideration when developing the cement procedure. Water flows, heaving shale, soluble sections, gas zones and thief zones are all met by mud conditioning. The soluble sections not only affect the volume but they also may cause the selection of a special cement which will set in the presence of the particular salt.

Thief zones and water flows affect the volume of cement used and the procedure followed and the latter also may affect the type of cement used, depending on the composition of the water. A thief or gas zone, or a water-flow zone, may require as much cement slurry to fill as the largest of cavities. In fact, cement slurry could be pumped into such zones continuously for a considerable period without sealing them off. While drilling, the loss of fluid is minimized by using a mud having a density which will not cause its entry into the formation, or, as in combating a water or gas flow, sufficient density to prevent entry of the water and yet not great enough to cause loss of fluid into the zone.

As soon as cement rises to any appreciable height above the thief or water-bearing zones, the balance is disturbed and the cement starts into the formation. Generally, if it is desired that the casing be protected above that point, multistage cementing is used.

Zones which will permit entry of the cement slurry may be blocked permanently while drilling by cementing them off, using the stage treatment. However, there are two difficulties, the first being the frequent lack of a proper seat for the packing element necessary to such jobs, and the second being the effect on the drilling fluid. Open-hole cementing of troublesome zones can and has been done successfully on a number of wells and it has considerable to recommend it.

In the cementing of casing in deep holes there is not only the possible loss of slurry into formations due to the excessive hydrostatic pressure in the annulus but there are the time and pressure factors. The pump may not be able to develop sufficient pressure to force the slurry back to the surface or the height desired. The casing also can withstand only so much pressure. If the time required for placement of the slurry is too long it may take its initial set and block further movement, leaving an excess of cement in the casing. A multi-

(Continued on Page 72)

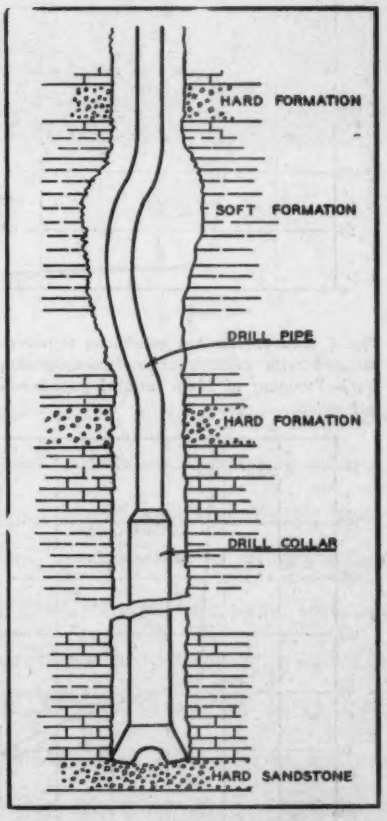


Fig. 5—One of the mechanical causes of cavities shown schematically. Running too much weight on the bit causes the drill stem to kink and contact the wall of the hole. If the contact is in a soft formation, a cavity results

Questions on Technology

by W. L. Nelson

Charts for Suction Lift of Pump

Note: The following charts and tabulations are offered in connection with the question answered on page 234 of the July 29, 1943, issue of The Oil and Gas Journal.

Charts showing the maximum lift or the head required in pumping a specific fluid can be constructed by the method outlined in aforementioned issue. These charts or curves consist of the vapor-pressure of the material added to which is the friction-loss constants shown in the previous tabulation.

The method involves the conversion of pressure from pounds per square inch to feet of fluid and hence an illustration is given here in the form of a table.

Figs. 1 to 4, inclusive, show suction curves for various pumps when handling: Fig. 1, liquid butanes, 60 lb.; Fig. 2, natural gasoline, 18 lb.; Fig. 3, aviation gasoline, 7 lb.; Fig. 4, topped crude oil, 26 A.P.I. and cracked residuum, 10 A.P.I.

Suction Lifts and Heads When Pumping 18-lb. Natural Gasoline

Temp. °F.	Vapor-press. lb./sq. in. abs.	Friction* lb./sq. in.	Pressure at suction connection, lb./sq. in.	Pressure in tank	Suction lift or head, lb./sq. in.	Specific gravity	Required lift or head (ft.)
0	1.5	7.0	8.5	†14.7	6.2 lift	0.699	20.5 lift
60	7.9	5.5	13.4	†14.7	1.3 lift	.670	4.5 lift
80	12.2	4.8	17.0	†14.7	2.3 head	.659	8.1 head
100	18.0	3.7	21.7	18.0	3.7 head	.647	13.2 head
120	25.9	3.7	29.6	25.9	3.7 head	.635	13.5 head
140	35.8	3.7	39.5	35.8	3.7 head	.622	13.8 head
160	48.4	3.7	52.1	48.4	3.7 head	.608	14.1 head

*July 29 issue, The Oil and Gas Journal. †Open to atmosphere.

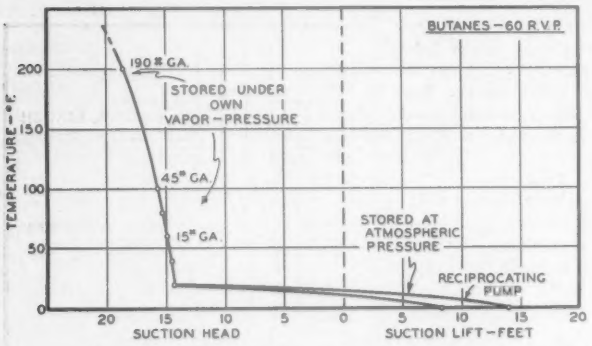


Fig. 1 (above)—Suction conditions required when pumping mixed butanes with centrifugal and reciprocating pumps. Fig. 2 (below)—Pumping of 18-lb. natural gasoline with a typical centrifugal pump

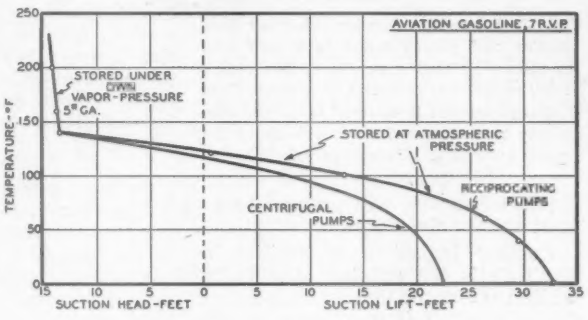
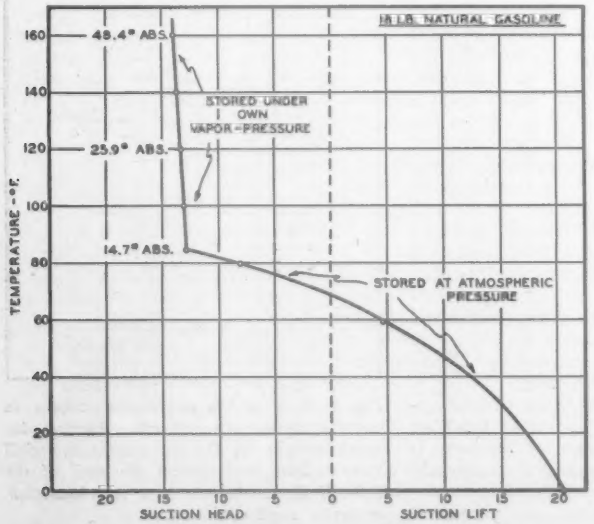
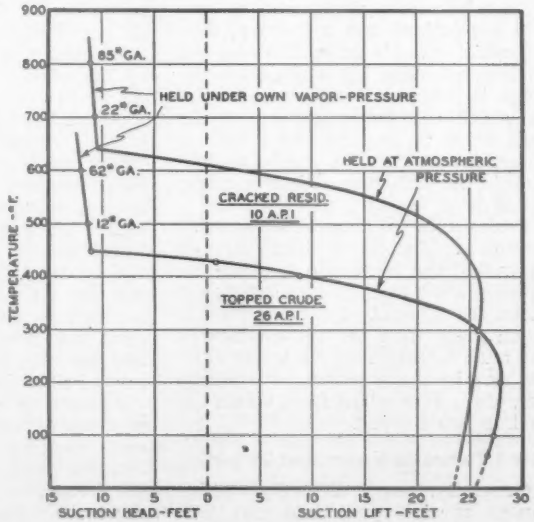
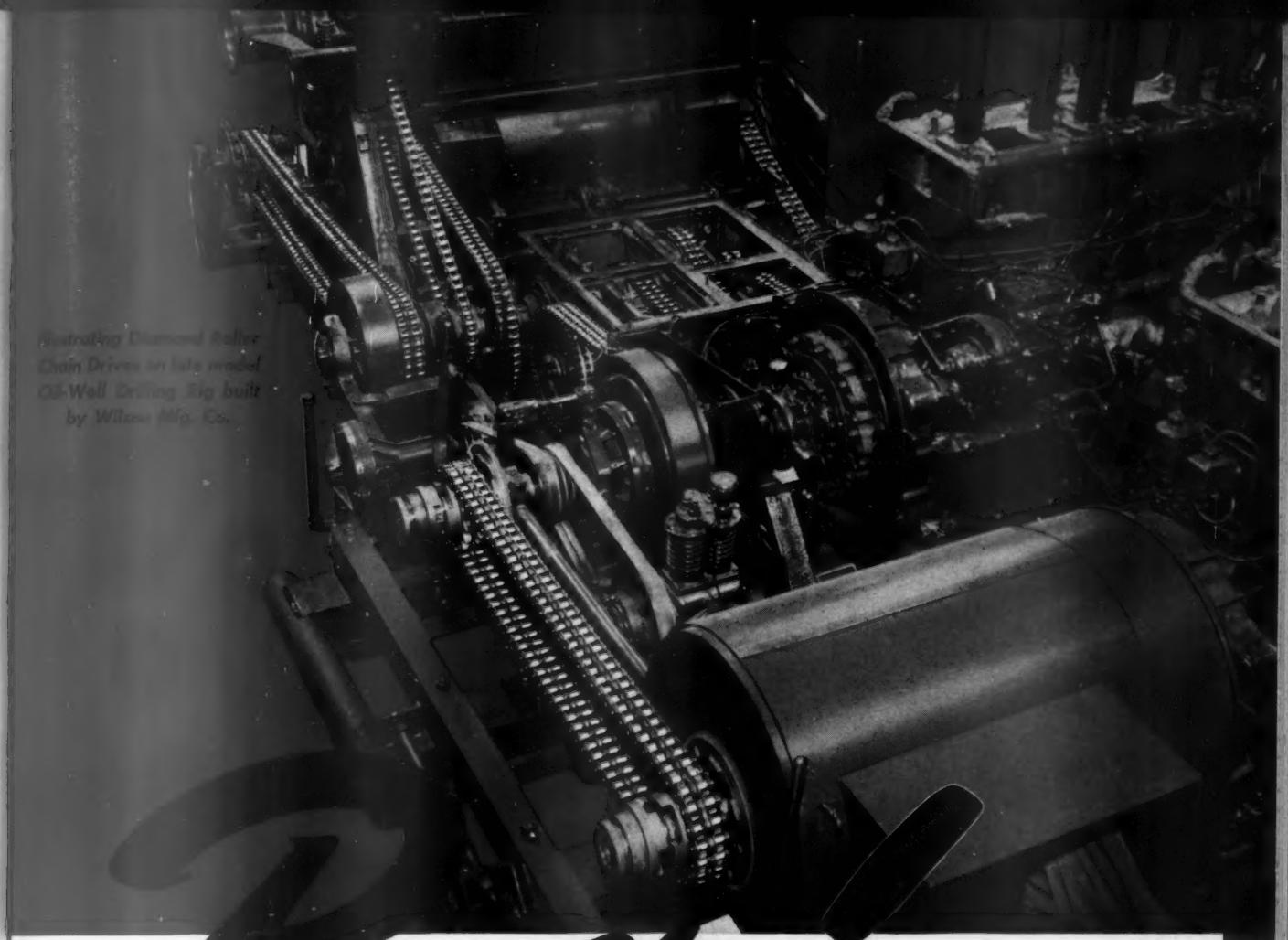


Fig. 3 (above)—Suction conditions when pumping aviation gasolines with centrifugal and reciprocating pumps. Fig. 4 (below)—Suction conditions when pumping typical cracked residuums and typical topped crude oils with reciprocating pumps







Illustrating Diamond Roller Chain Drives on late model Oil-Well Drilling Rig built by Wilson Mfg. Co.

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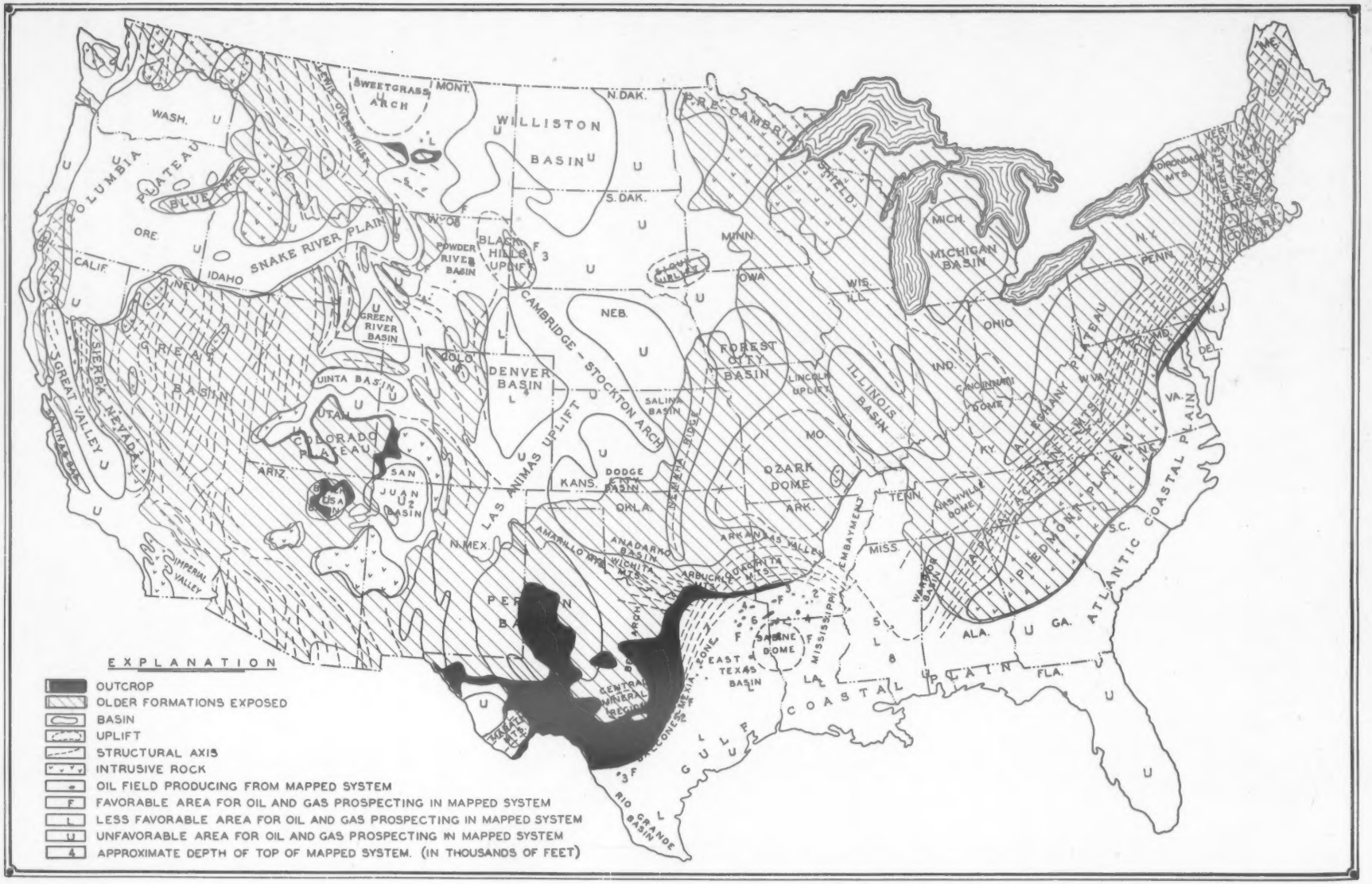
DIAMOND ROLLER CHAINS

Lower Cretaceous



OIL ZONES OF THE UNITED STATES

Lower Cretaceous

(Compiled by The Oil and Gas Journal)

PRINCIPAL PRODUCING HORIZONS:

Sandstones: Paluxy, Hosston (Travis Peak), Lakota and Cut Bank.

Limestones: Mooringsport, Rodessa, and Sligo, or Pettit (Glen Rose); Buda and Edwards.

DISTRIBUTION OF PRODUCING AREAS: Principal production from Lower Cretaceous beds is around the margins of the East Texas embayment which extended well around the northern slope of the Sabine uplift in northwestern Louisiana. The earliest deposits were the **Hosston** or **Travis Peak** formation which produces in Urbana, Champagnolle and other fields in Union County, Arkansas, with some minor production in North Louisiana. A recent discovery in Franklin County, Texas, may extend development of this formation considerably. In the series formerly known as **"Glen Rose"** the lowest limestone member, the **Sligo** or **Pettit** is not an important producer in Arkansas but is an important pay on the north and east flanks of the Sabine uplift. The **Rodessa** member contains several individual pay zones which yield large quantities of oil and gas in the tri-state Rodessa field and in other pools in eastern Texas along the lower part of the western flank of the basin. The uppermost member of the Lower Cretaceous, the **Paluxy,** has a wide range of hydrocarbons from gas distillate in the Chapel Hill field, through high-gravity crude at Quitman to low-gravity sulfur-bearing crude at Talco and Sulphur Bluff. It now appears to be the most widespread pay in the Lower Cretaceous but this may be due to lack of prospecting in the lower zones.

The **Buda** lime produces in a few small fields near the Mexia-Balcones fault zone southwest of the main East Texas district. Farther to the southwest, in the South Central Texas district, another Lower Cretaceous limestone, the **Edwards,** is the principal producing horizon. Most of the fields producing from the Edwards lime lie along faults but a number of recent discoveries indicate that this horizon may pay off in areas not associated with faulting.

In the Rocky Mountain area, the Lower Cretaceous sea advanced northward into Wyoming where the **Lakota** sand is a producer of minor importance around the Powder River and Wind River basins. The **Cut Bank** or **Sunburst** sand of Montana is the basal member of the Kootenai formation which was deposited by a Lower Cretaceous sea advancing from the north. It forms the principal pay at Cut Bank and a minor one at Kevin-Sunburst.

EXTENSION INTO OTHER AREAS: The Lower Cretaceous pays as known at present produce on structure within basins, along faults both marginal to basins and in the deeper parts and as stratigraphic traps formed as the sea advanced into the basins. At present it produces in four districts, in widely scattered areas. In Mexico, Lower Cretaceous limestones were the main producers in the old fields of the Tampico-Tuxpan area and these have been correlated with the Edwards limestone of Texas. This suggests a possible continuation with the San Antonio area. Deeper drilling along the Wilcox trend in Texas and Louisiana has a good chance of finding productive Lower Cretaceous beds and this series is now the objective of many wildcats in the active East Texas play.

In the Rocky Mountain area, relations are somewhat obscure. There is an active campaign now under way with an extension of the Cut Bank stratigraphic trap as an objective. This is a reversed trap at Cut Bank where the former shore line is on the downstructure side and the upper limit of the field is formed by a transition from porous sand into impervious formations. This suggests the possibility of other traps to the west where the dips are reversed. Between the areas where the Kootenai and the Lakota produce the Lower Cretaceous formations (known as the Cloverly) have not been correlated definitely with either so that there are a number of interesting possibilities for stratigraphic traps throughout southern Montana and northern and Central Wyoming in the Lower Cretaceous.

GENERAL GEOLOGICAL CONSIDERATIONS: The Lower Cretaceous formations, considered as a whole, afford as many complications as any group of rocks of similar extent in the United States. For this reason, their development has been irregular. The recent increase in the number of known objectives in this series in East Texas indicates the extent of the possibilities afforded in other areas. In Texas there are several unconformities in the section due to the successive advances and retreats of the sea and each of these breaks represents a possible locus for the accumulation of oil.

The fact that no beds of Lower Cretaceous age have been found east of South Central Arkansas, except in Maryland and New Jersey makes predictions regarding possibilities in this area impossible beyond pointing out that as the series thickens to the east where it is known, it is practically certain that deep drilling will locate it east of the Sabine uplift.

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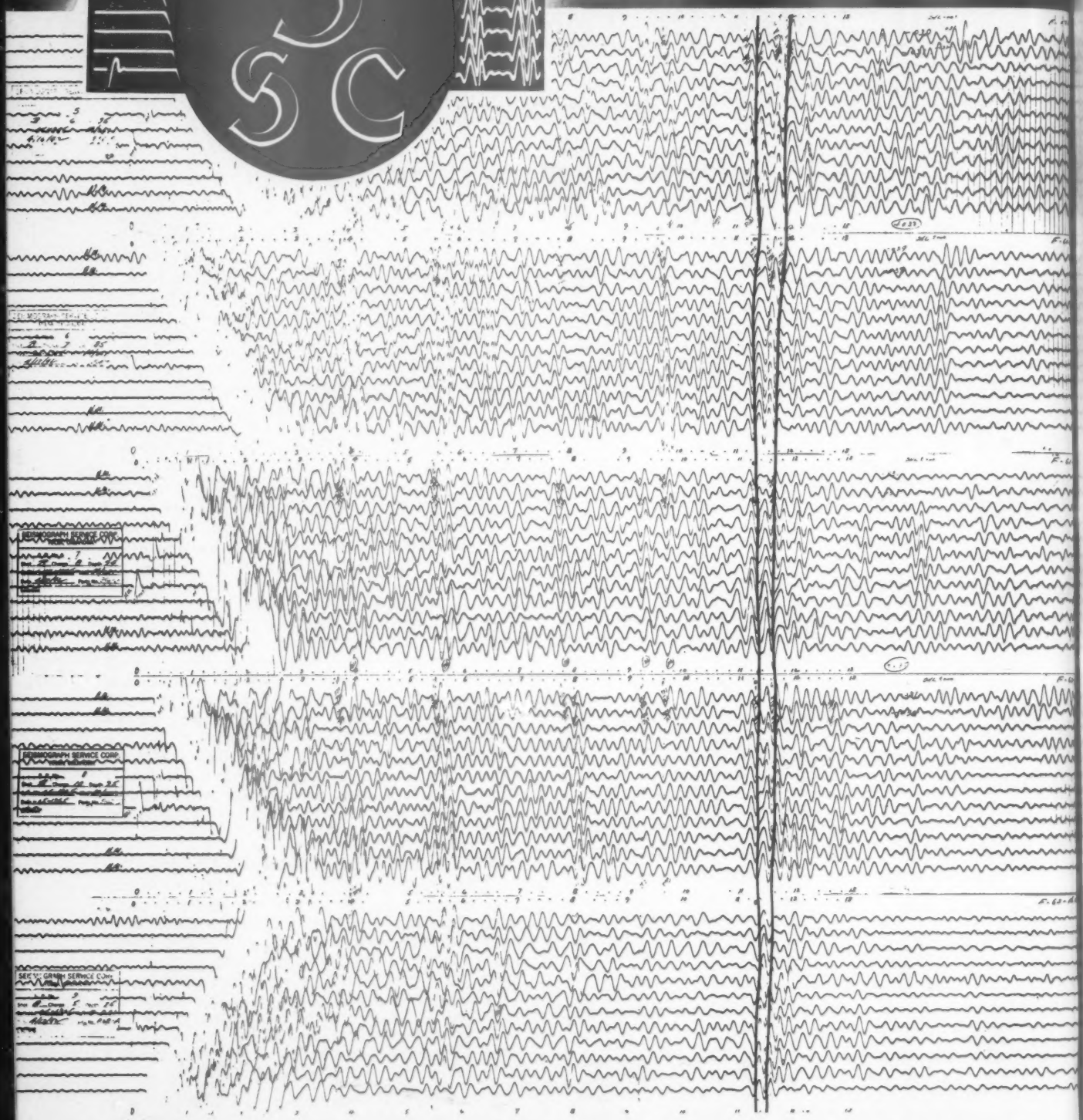

A West Texas Traverse Showing Interesting Convergence

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Oil-Well Pumping Practices—No. 7

Formulas for Calculation Of Sucker-Rod Loads

by J. Zaba

Three well-load formulas are presented and discussed, following a brief review of the complexity of the problem of calculating well loads, which serves to place the formulas in their proper perspective. This series began in the July 1 issue, with installments in each subsequent issue.

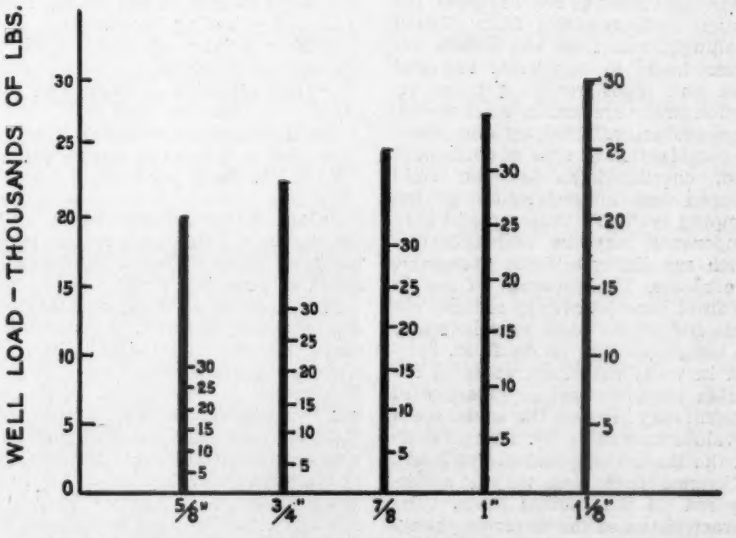
THE well loads of a sucker-rod pumping installation are either calculated or measured directly with a dynamometer. In formulas used for calculation of well loads certain dimensional and other sucker-rod constants have to be used. The constants most often needed are shown in Table 1. The dimensional constants are those of the American Petroleum Institute's Standards No. 11-B, ninth edition, May 1942. The weight per foot is that given by manufacturers. Other constants have been calculated. From these constants other data needed for solution of the well-load formulas can be conveniently calculated. For instance, the weight of rods in fluid can be calculated from data on displacement by dividing the figure on displacement for given length of rod by 231 (number of cubic inches in a gallon), multiplying by weight per gallon of the fluid (to be obtained from tables; for instance, weight per gallon of 30° A.P.I. oil is 7.296 lb.), and subtracting from the actual air-weight of the length of rods.

The chart shown in Fig. 1 can be used for conversion of well loads to corresponding stresses, in different sizes of sucker rods, and is a graphic representation of the expression stating that stress equals load divided by area. The chart can also be used for determining what load can be handled by a rod of given diameter and given safe working stress. For instance, a well load of 10,000 lb. results in a stress of 22,500 lb. per sq. in. in a ¾-in. sucker rod. Conversely a 1-in. rod with a working stress of 20,000 lb. is capable of handling a well load of 17,600 lb.

Calculation of Loads

The most satisfactory determination of well loads is through direct measurement with a dynamometer. Cases, however, do occur when the approximate load has to be calculated. This happens, of course, primarily in designing of new installations when no load measurements can be made, unless a temporary unit is available from which load data for permanent installation could be secured. Necessity for calculating the well loads may arise also in the case of installations already in operation if a dynamometer is not available or if it is not convenient to use one.

Three formulas for calculating the polished-rod loads are now generally used, and there exists considerable difference of opinion as to their respective merits and accuracy. This is rather to be expected. Proof of the value of any formula of this type is, of course, the agreement of results obtained through its use with data secured through actual measurement of the loads. While numerous data can be, and have been, presented to support the accuracy of any of the three formulas, it is quite apparent that no formula can be devised to cover satisfactorily all possible nor-



CORRESPONDING STRESSES – THOUSANDS LBS. PER SQ. IN. IN SUCKER RODS OF DIFFERENT SIZES

Fig. 1

TABLE I

Size of rod—	⅝-in.	¾-in.	⅞-in.	1-in.	1⅛-in.
Dimensions of couplings for "double pin" rod, inches	1½ x 4	1⅝ x 4	1¾ x 4	2¼ x 4 or 2 x 4	2⅝ x 4
Nominal outside diameter of pin, inches	⅞	1 1/16	1 1/16	1⅜	1 1/16
Outside diameter of box in "pin and box" rod, inches	1⅜	1½	1⅝	2	2¼
Cross-sectional area of rod, square inches	.30566	.44156	.60132	.78500	.99351
Weight per 100 ft., pounds	116	163	216	288	364
Displacement,* per 100 ft., cubic inches:					
For 25-ft. rods	384	556	752	987	1,257
For 30-ft. rods	380	550	744	977	1,241
Stretch, inches per 100 ft. per 1 lb.	.000130	.000091	.000066	.000051	.000040

*Approximate.

TABLE 1—POLISHED-ROD STROKE—INCHES

S.p.m.	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	60	72
6	.027	.029	.031	.033	.036	.038	.040	.042	.044	.047	.049	.051	.053	.056	.058	.060	.062	.067	.080
8	.035	.038	.041	.044	.047	.050	.053	.056	.059	.062	.065	.068	.071	.074	.077	.080	.083	.089	.106
10	.044	.048	.052	.056	.059	.063	.067	.070	.074	.078	.081	.085	.089	.093	.096	.100	.104	.112	.134
12	.053	.058	.062	.066	.071	.075	.080	.084	.089	.093	.098	.102	.106	.111	.116	.120	.124	.133	.160
14	.062	.067	.072	.078	.083	.088	.093	.098	.103	.109	.114	.119	.124	.129	.135	.140	.145	.155	.186
16	.071	.077	.083	.089	.094	.101	.106	.112	.116	.124	.130	.136	.142	.148	.154	.160	.166	.177	.213
18	.080	.086	.093	.100	.107	.113	.120	.127	.133	.140	.146	.153	.160	.166	.173	.180	.186	.200	.240
20	.089	.096	.104	.111	.118	.126	.133	.141	.148	.155	.163	.170	.178	.185	.193	.200	.208	.222	.266
22	.098	.106	.114	.122	.130	.138	.147	.155	.163	.171	.179	.187	.196	.204	.212	.220	.228	.244	.293
24	.107	.115	.124	.133	.142	.152	.160	.169	.175	.186	.195	.204	.213	.222	.231	.240	.248	.268	.320
26	.116	.125	.135	.144	.154	.164	.173	.183	.193	.202	.212	.222	.231	.242	.251	.260	.270	.290	.347
28	.124	.135	.145	.156	.166	.176	.186	.197	.207	.218	.228	.238	.249	.259	.270	.280	.290	.311	.373
30	.133	.144	.156	.167	.178	.189	.200	.211	.222	.234	.245	.256	.267	.278	.290	.300	.312	.334	.400
32	.142	.154	.165	.177	.189	.202	.214	.225	.237	.248	.261	.272	.284	.296	.308	.320	.333	.355	.426
34	.151	.164	.176	.189	.202	.214	.227	.239	.252	.266	.277	.290	.302	.315	.328	.340	.352	.378	.454

mal well conditions. If such a formula could be evolved it would be too complicated for practical use. Furthermore, no mathematical analysis can cover unexpected and abnormal influences which may affect the well loading. Finally any formula is, of necessity, based on a given set of conditions and it would be very difficult to make provisions for possible changes of these conditions during the life of a well.

To illustrate further the above statements it is worthwhile to mention again the factors which contribute toward the resultant well load. As stated previously in this series (Installment 3), these factors are: The deadweight loads of rod and fluid, the friction loads resulting from friction of plunger, rod, fluid and others, dynamic loads to accelerate rod and fluid and loads resulting from vibration in the system. In other words, the loads are affected by any possible combination of type of equipment used, characteristics of the fluid pumped and characteristics of the pumping cycle. To these normal load components may be added factors which are difficult if not impossible to evaluate. The presence of gas in the fluid handled always reduces the loads and at the same time increases the compressibility of the fluid. Friction in wells with high angle of deviation from vertical or presence of paraffin may increase the actual loads to values exceeding by a large margin the theoretically calculated loads. Difference shock loads may be superimposed on the normal loads. The characteristics of the reservoir, changing during the life of a well, have their effect.

This brief review of the complexity of the problem of calculating well loads has as its purpose placing of the well-load formulas in their proper perspective. No single formula can take into consideration all of the factors involved. A compromise has to be made between simplicity and accuracy. Since certain factors considered as being less important have to be disregarded and since many assumptions have to be made, any formula is only an approximation. The most important thing is that loads calculated by the formula should be higher than those which will actually occur. Experience with wells of the same type as the well on which the loads are being calculated will help in selection of a proper safety factor.

The three well-load formulas are given herewith.

The first formula, suggested by J. C. Slonneger, is recommended by the American Petroleum Institute for calculations of peak loads for designing of surface pumping equipment. The formula is as follows:

$$P = (W_r + W_f)\left(1 + \frac{S \times S.p.m.}{5{,}400}\right)$$

Where

P = peak polished rod load (lb.)
W_r = weight of rod string, neglecting buoyancy
W_f = weight of fluid load = $0.034D^2L$
D = effective diameter of plunger (in.)
L = depth of pump (ft.)
S = polished-rod stroke (in.)
S.p.m. = strokes per minute

Values of expression S×S.p.m./5,400 are shown in Table 2 for certain combinations of length of stroke and speed of pumping.

The formula was evolved for average conditions and is particularly useful because of its simplicity. It is entirely satisfactory for normal conditions and for slow speed of pumping. It has been reported, for instance,[1] that the average peak polished-rod load calculated with this formula for 32 wells on the west side of the East Texas field was 10,115 lb. while the average actual load as determined by dynamometer was 7,549 lb. At higher speed of operation the formula appears to give too low values for peak load and a substantial safety factor would have to be used under such conditions. In comparing the A.P.I. formula with the Langer formula (given in this installment) Dralle and Lamberger[3] suggest that a safety factor of the order of 1.6 would be needed at high speeds for the A.P.I. formula. Other authors suggest the factor of 25 per cent.

The second formula is that suggested by Kenneth N. Mills.[2] The formula is based on two primary assumptions: (1) That the motion imparted to the well is simple harmonic. Although this is not strictly true (Installment 3), the error resulting from this assumption is not great so far as maximum acceleration is concerned, (2) that the acceleration of fluid contributes little to the peak well load. This assumption is justified by the difference of the rate of transmission of stresses in sucker rods and in the fluid and by the comparatively high degree of compressibility of the fluid. The formula is as follows:

$$P = W_o + W_r\left(1 + \frac{LN^2}{70{,}500}\right)$$

where

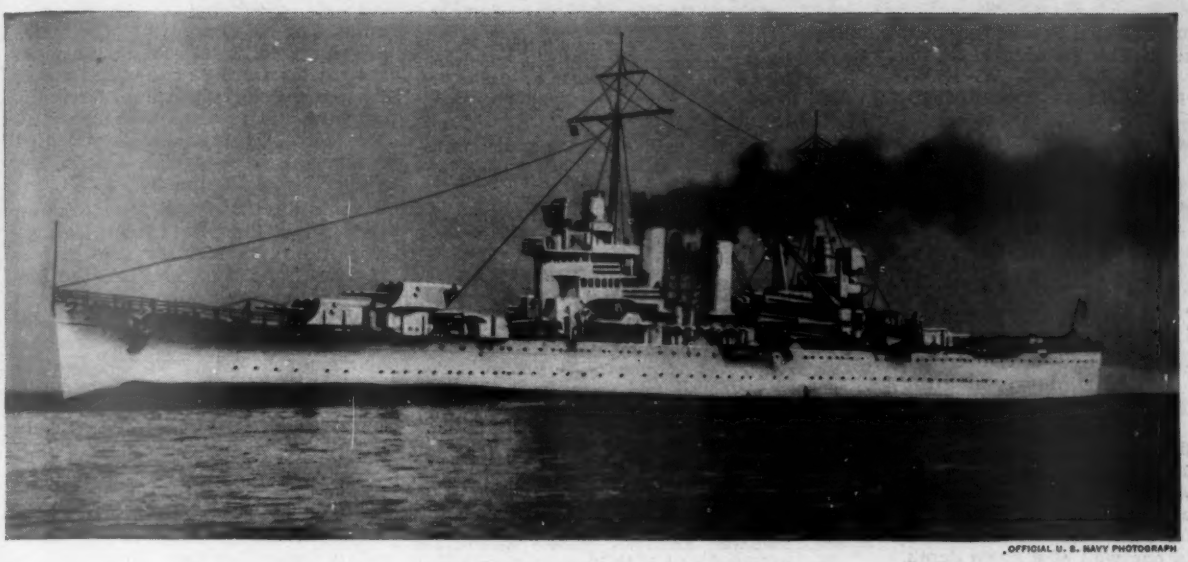
P = peak polished-rod load (lb.)
W_o = weight of fluid (lb.)
W_r = dry weight of rods (lb.)
L = length of stroke (in.)
N = number of strokes per minute.

The formula, like the A.P.I. formula, has the advantage of simplicity. It agrees fairly well with actual load measurements. In a group of wells tested[2] the formula agreed with actual load measurement in 58 per cent of cases with accuracy of from 90 to 100 per cent, in 25 per cent of cases, with accuracy of from 80 to 90 per cent, in 17 per cent of cases, with accuracy of from 0 to 80 per cent. The formula is quite widely used.

Langer Formula

The third formula is that developed by F. B. Langer. It is a result of over 200 carefully conducted tests performed on an especially selected single well, with different conditions of speed, stroke length, plunger sizes, types of prime movers, etc. The pumping installation was equipped with a number of instruments to measure simultaneously loads and displacement during the pumping cycle at different points of the pumping mechanism.[3,4]

The formula introduces factors such as fluid level and natural vibration of rods which affect the well loads and which are not taken in consideration in the two formulas previously given. This results in a formula quite complex and to attain a simplification, Langer worked out a simplified field formula in which certain factors are omitted and the constants



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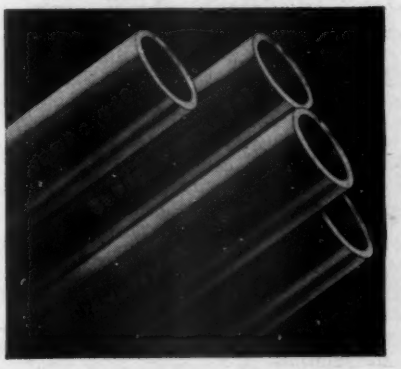

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are adjusted to take care of this omission. The formula is as follows:

$$P = W_r - W_{rb} + W_{od} + 0.75\,LN\,[17A_r\,\text{Tan.}\,(0.0004DN)^\circ + A_o]$$

where

P = peak polished-rod load (lb.)
W_r = weight of rods in air (lb.)
W_{rb} = weight of fluid displaced by full length of rod string (lb.)
W_{od} = differential fluid load
L = length of polished-rod stroke (in.)
N = number of strokes per minute
A_r = area of sucker rods (in.²)
D = length of rod string, feet
A_o = net plunger area (in.²)

Results obtained from the use of this formula agreed quite closely with actual load measurements on the test well previously mentioned. The main objections raised in discussion of this formula were that it was tested only in one well of a given depth.

Measuring of Loads

General consideration of well-load measurements with dynamometer has been given in Installment 4 of this series. Here only the interpretation of the card from the standpoint of loads recorded has to be considered.[5,6] Con-

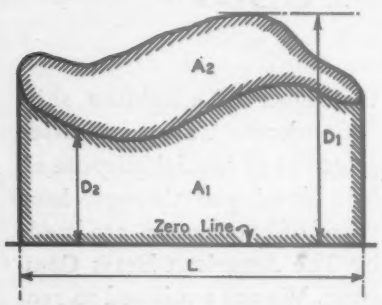

Fig. 2—Calculation of loads from a dynamometer card

sidering a card shown in Fig. 2, the loads would be as follows:

Maximum load = $C \times D_1$
Minimum load = $C \times D_2$
Range of loads = $C \times D_1 - C \times D_2$
Av. upstroke load = $C(A_1 + A_2)/L$
Av. downstroke load = CA_1/L

where

C = calibration constant (lb.)
D_1 = maximum deflection (in.)
D_2 = minimum deflection (in.)
A_1 = lower area (in.²)
A_2 = upper area (in.²)
L = length of card (in.)

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Cement Troubles Start During Drilling

(Continued from Page 67)

stage cement job, is of course, the answer.

A temperature survey run just before casing is placed in the hole provides the necessary information on this subject. Both the cement selected and the methods employed will be affected and it is important to know whether an abnormal temperature exists. If the well is in an area about which considerable is known, this temperature survey may be unnecessary.

A second temperature survey run while the cement is setting behind the pipe will determine to what height it has risen. Another method is to add a small amount of radioactive material to the cement and then run a radioactive logging survey.

Temperature and radioactive surveys run to determine the height of cement have shown some interesting things. In some cases it was found that the top of the cement was lower than the calculations showed it should have been and in other cases it was considerably higher. The latter is really worse than the former for it shows that the cement has channeled up beside the pipe rather than filling the annulus. Sometimes when circulating cement slurry to the surface behind the pipe, it is found that the slurry returns quicker than it should, indicating channeling. The complete circumference of the pipe is not protected by the cement and can fall prey to all the troubles which the cement was intended to prevent.

A carefully run temperature survey might show where the channeling took place but it may be necessary to perforate and test the casing to locate the unprotected section and then squeeze additional cement slurry into the annulus.

Prevention of channeling of the slurry is not easy. One method is to circulate drilling fluid long enough before the cement is placed to insure mobility of the fluid in the annulus. Another help is rapid placement of the cement. Centering of the casing in the hole is an aid. More drastic measures include the rotation of the casing and the raising and lowering of the casing while the cement slurry is being displaced from the inside of the pipe and being placed in the annulus. The rotation of the pipe forces the slurry to spiral around the pipe; the rapid lowering of the pipe causes the cement slurry to surge, forcing it outward and upward with considerable force. There are also patented equipment items which aid in the prevention of channeling.

Removal of the mud filter cake on the wall of the hole is likewise necessary to a satisfactory cement job. If there is no bond between the formations and the cement, fluids can travel down the hole until an unprotected spot in the casing is reached. Scratchers help in removing the filter cake and the cement slurry has a scouring action, particularly if the slurry is not allowed to channel and is forced against the wall of the hole.

So far only the failure of the cement to protect the casing in the upper part of the hole has been mentioned, although many of the foregoing difficulties can cause trouble around the casing seat. Failure at that point has not been so common in recent years, principally because more attention has been paid to insuring against it. However, in some cases the lower portion of the pipe is not protected any better than the upper part. There is the case where the pipe was cut a short distance above the casing shoe to open a second zone and the lower portion dropped down the hole, indicating it was unsupported by the cement.

Special Cementing Head

The special cementing head which eliminates the necessity of exposing the interior of the casing to the atmosphere while the pump-down plug is being inserted helps avoid such failures. During this time, while the head is removed, the casing becomes partially filled with air and if the plug is pumped down too far, air instead of cement slurry, is located around the casing shoe. Stopping the plug far enough off bottom will insure that uncontaminated cement slurry is around the shoe. Many companies run a shoe on bottom and a float one joint above bottom, insuring that the plug cannot get closer than 30 or 40 ft. to the shoe.

In areas where considerable trouble is had with casing seats leaking, a pack-type shoe, a tapered casing seat or a bottlenecked hole may aid in avoiding later failure.

No attempt has been made to discuss the equipment, cement characteristics, or methods used in accomplishing various objectives. These are well known to production men. There is one frequently ignored principle which should be mentioned and that is the immediate repair of a cement job as soon as it is evident it is not a complete success. This is particularly true where the cement does not rise sufficiently above an upper horizon which it is planned to exploit later.

ANALYSIS OF ENGINE-REPAIR COSTS

FREQUENT checks of repair expense often may indicate some method or change in operation whereby savings can be effected.

What constitutes an expensive well from a standpoint of repairs is sometimes difficult to determine. Usually all wells with repair expense greater than the average for wells in the same locality are investigated in the cost analysis.

Upon examination of repair expense, it will be found that high expense at some of the wells was occasioned by major replacements of equipment. Such items are usually nonrecurring and the repair expense can be expected to drop to normal for future periods. Excessive expenditures at many wells, however, are occasioned by recurring expense on particular items of equipment. These wells are then selected for further investigation, and the basic cause of equipment failure is determined.

Such a cost analysis is illustrated in the present problem concerning a well with excessive repair expense. This particular well has a repair expense considerably above the average for other wells in the same district. The total expense by quarters for 4 years of operation is shown in the accompanying chart.

Engine Expense High

Examination of the records shows that engine repairs account for a large portion of the total expenditure and upon further investigation it is found that practically all of the engine expense is due to repairs on the engine fuel system. This particular engine operates on "sour" crude oil as a fuel and most of the expense is caused by failure of the spray nozzles. All other engines on the same lease are operating on purchased natural gas. Since there is little likelihood of reducing engine expense at this well, a cost estimate for converting the oil engine to natural-gas operation was prepared. This estimate is shown in the accompanying tabulation. The estimated repair cost per unit day for natural-gas operation was based on repair expense for 10 similar-type engines in the same locality. The estimated cost for gas consumption was based on a price of 12 cents per 1,000 cu. ft. The cost of converting the engine to gas operation also includes installation of a gas line to the location.

It will be noted that an estimated savings of $1.38 per day on operating expense can be effected by the conversion. This will pay out the installation cost in 236 days.

EXPENSE ESTIMATES FOR ENGINE CONVERSION

Engine Expense

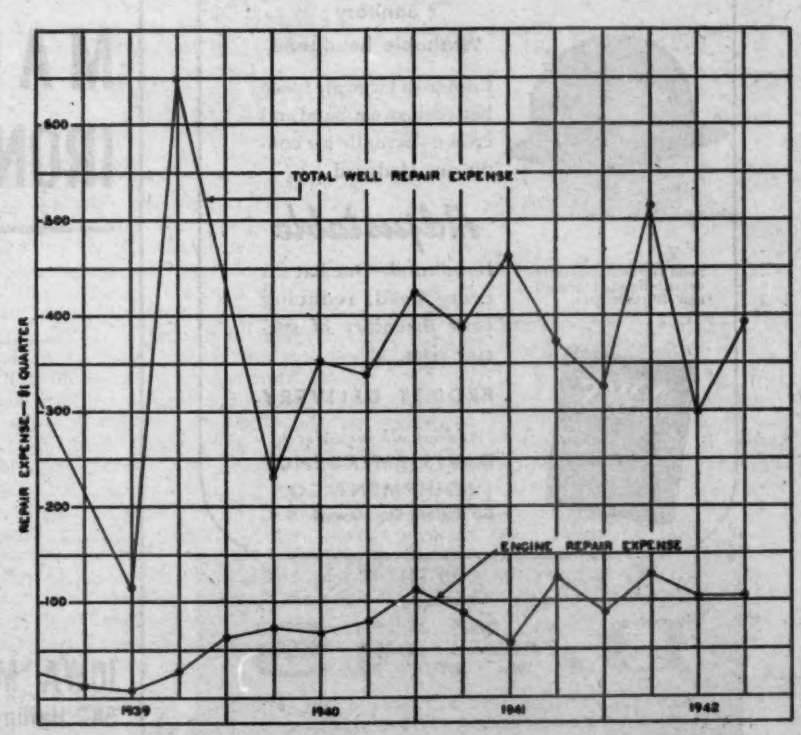
Year	Hours operated	Unit days operated	Repair expense	Repair cost per unit day	Cost of oil per unit day	Total engine operating expense unit-day
1939	4,340	177	$76.00	$0.43	$1.10	$1.53
1940	5,720	238	278.00	1.17	1.10	2.27
1941	5,970	249	378.00	1.52	1.10	2.62
1942	6,020	251	421.00	1.68	1.10	2.78

Well Expense

Year	Total well expense	Total engine expense	Engine fuel system expense	% of engine expense due to fuel system
1939	$957	$76	$62	81.5
1940	1,341	278	249	89.6
1941	1,639	378	346	91.5
1942	1,517	421	417	99.0

Calculated Operating Cost With Natural Gas as Fuel

Estimated fuel (natural gas) cost per unit day	$1.04
Estimated repair cost per unit day	0.28
Total operating cost per unit day	$1.32
Estimated reduction in operating expense ($2.70-$1.32)	$1.38
Cost of converting oil engine to gas operation	$326.00
Payout on cost of conversion (days)	236



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Engineering Fundamentals No. 100

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

METHODS OF DETERMINING ABSOLUTE POROSITY

SEVERAL different methods have been devised for determining the absolute porosity of sands. The method used in any particular case depends upon the following factors:

1. Type of sand (consolidated or unconsolidated).
2. Accuracy desired.
3. Time available for the test.

Unconsolidated sands.

An unconsolidated sand is so loose that a core representing the actual condition of the sand in place cannot be obtained. Such a condition is generally due to complete absence of cementing material in the sand, which means that there is no bond to hold the grains together in the form of a core sample. The Oklahoma City Wilcox is a good example of such a sand. A laboratory method for measuring the porosity of such a sand will be described.

The sand is dried in an oven at about 110° F. A small amount (2 or 3 cc.) of kerosene or tetrachloroethane is accurately measured and placed into a 50-cc. graduate. An equal volume of the dry sand is added and tightly tamped with a flat-ended glass rod of about ⅜-in. diameter. This process is continued, adding the sand about 1 or 2 cc. at a time, tamping, and also adding just enough of the liquid to saturate the pores without any excess. About a 20 or 30-cc. pack should be prepared. An accurate record of the volume of liquid added will give a volume representing the pore space in the pack. The bulk volume of the pack may be read from the graduations on the 50-cc. graduate. The absolute porosity of the pack, then, may be determined by dividing the volume of liquid added by the bulk volume of the pack. The porosity obtained by such a test may not represent the true porosity of the undisturbed sand in the reservoir, due to possible variations in packing; but the results represent as close an approximation as could be obtained by any other method.

Another method, that should give results comparable to those obtained by the method just described, is quite similar in principle but does not involve the saturation of the packed sand with a liquid. In this method, the sand should be thoroughly dried in an oven at about 110° F. Two samples, of about 30-cc. bulk volume each, should be taken and carefully weighed. One of the samples is carefully transferred to a 50-cc. graduate about 2 cc. at a time, tamping between each addition with a flat-ended glass rod. When packed as tightly as possible the bulk volume of the pack is read from the graduate. In order to avoid errors due to spilling some of the weighed sample, it may be better to first weigh the clean graduate and then weigh it with the sand in it to obtain the net weight of sand. The weight of the sand in grams divided by the bulk volume of the pack in cubic centimeters gives the bulk density in grams per cubic centimeter.

The second part of the original dry sand sample is now used for determining the grain density of the sand. This may be done by filling a burette to a point slightly above its bottom graduation with kerosene, reading the level of the kerosene, pouring the weighed sand grains slowly into the top of the burette, letting them sink below the kerosene level and then reading the kerosene level.

The statement just given for this method should be qualified by a few finer points of technique in order to insure accurate results. In the first place the weighed sand sample should be carefully protected from air currents to insure that none of it is blown away rather than being introduced into the burette. A clean and dry beaker or similar container with high sides will also aid in this respect. A large piece of clean white paper placed below the burette during the pouring operation will allow one to recognize whether any of the sand has been spilled and will furnish an easy means of recovering it. It is well also to use a funnel at the top of the burette which should not only prevent the spilling of any of the sand but also prevent collection of sand on the wetted portion of the burette above the liquid level. So, the stem of the funnel should be long enough to reach from the top of the funnel to the liquid level. The inside of the funnel stem must be perfectly dry; and during the introduction of the sand into the burette the funnel should be held so that the bottom tip of its stem is just above the liquid level. This will necessitate raising the funnel as more and more sand is needed. It is also well in filling the burette with kerosene to draw the liquid in from the bottom rather than pouring it in from the top, so that the burette will not be wet above the liquid level.

The difference in the kerosene levels before and after adding the sand give the grain volume of the second weighed portion of sand. The grain density of the sand in grams per cubic centimeter may now be calculated by dividing the weight of the sand in grams by the grain volume of the same sand in cubic centimeters.

The absolute porosity of the pack may now be determined by the following equation,

$$P = \frac{D_g - D_b}{D_g} \times 100$$

where,

P = absolute porosity, per cent
D_g = grain density, gm. per cc.
D_b = bulk density, gm. per cc.

The latter method described above requires more time and would probably not be used unless one already knew the grain density or wished to determine it for some other purpose.

It should be realized that for an unconsolidated sand the absolute porosity is the same as the effective porosity.

Methods of determining the absolute porosity of consolidated sands will be discussed in the next installment.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

THE U.S.S. OKLAHOMA IS RIGHT SIDE UP

AMERICAN CABLE TRU-LAY PREFORMED WIRE ROPE DID THE PULLING

Official U. S. Navy photograph

Pearl Harbor, Hawaii. Even Date—The 29,000 ton U.S.S. "Oklahoma" is again afloat. During months of preparation by the Pacific Bridge Company, some 50 miles of TRU-LAY Preformed and CRESCENT Non-Preformed wire rope (ranging in diameter from 1″ to 3″) was shackled to the huge ship, then in less than 69 hours operating time the "battlewagon" was pulled out of her list of 151 degrees back to within 10½ degrees of natural position.

For this spectacular job, a sling or bridle was put over the ship. This bridle was made of 42 lengths (averaging 360′) of 3″ CRESCENT Non-Preformed rope. Attached to this were 21 reels (10,000′ each) of 1″ TRU-LAY Preformed wire rope. These were attached to winches ashore, and after less than three days steady pulling, the "Oklahoma" was right side up.

The American Cable Division, not only for this shining example but for its less spectacular day-in and day-out effort, is proud to be numbered among those who are working to speed the war's victorious end.

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Discovery Well, Unnamed Field, Clay County, Texas

L. T. BURNS | **J. P. THOMPSON**

4½ miles SE of Joy, 500-ft. sand 556.5 ft. E of NW cor. Blk. 29, Webb subdivision, San Augustine Univ. Sur., Abstract 403

CONTRACTOR

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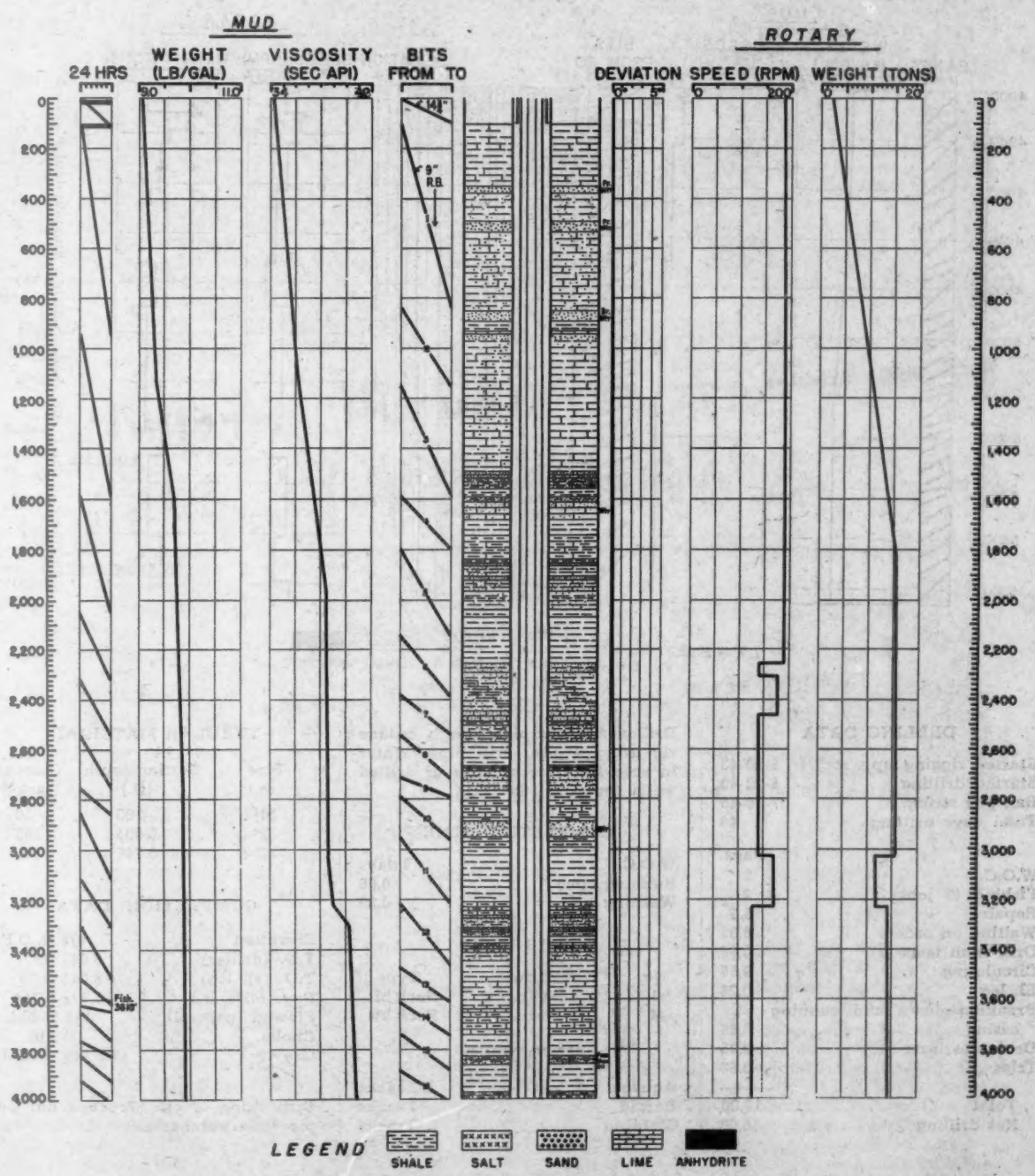

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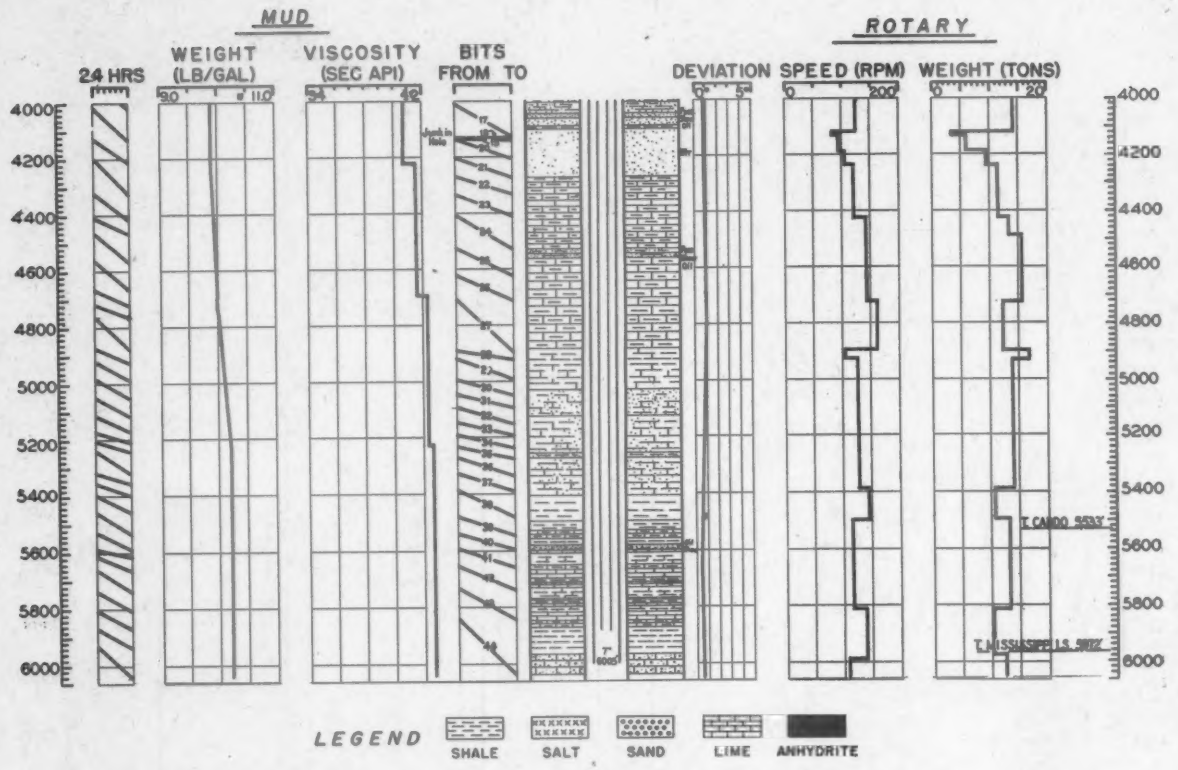
Journalog

Discovery Well, Unnamed Field, Clay County, Texas (Continued)



DRILLING DATA

Started rigging up	5-20-43
Started drilling	5-22-43
Ran pay string	7-10-43
Total days drilling	49

	Days
W.O.C.	2
Fishing (3 jobs)	2
Repairs	5.5
Waiting on orders	0.33
Drill-stem tests (2)	0.66
Circulating	0.66
El. log	0.25
Breaking down and running casing	0.66
Deviation tests	0.25
Trips	3.66
Total	16.00
Net drilling	33.00

Drilled and completed with butane rig using 4½-in. drill pipe. Water in area from stock tanks or drilled wells (approx. 500 ft).

COMPLETION TIME

W.O.C.	3 days
Running time	0.66
Washing	0.33

BITS USED

No.	Size	Type
1	14¾-in.	Rock bit
44	9-in.	Rock bit

MUD USED

Aquagel	152 sacks
Baroid	2 sacks
Stabilite	2 sacks

TUBULAR MATERIAL

Size (in.)	Setting depth (ft.)	Cement (sacks)
10¼	103	50
7¼	6,005	250
2¼	5,746	...

COMPLETION DATA

Elevation	976 ft. D.F.
T.D. (driller)	6,041 ft.
T.D. (el. log)	6,045 ft.
Pay (Miss. ls.)	5,972-6,044
Flowed (natural)	149.59 bbl.
Choke	¼-in.
Gravity	45.5°-46° A.P.I.

Disposition of oil: Trucked out by pipe-line purchaser.

Natural Gas

Hope's Hearing Delayed by Power Board Until August 31

WASHINGTON, D. C.—Hearing on application of Hope Natural Gas Co., Clarksburg, W. Va., for permission to construct and operate a 22-in. natural gas pipe line from the Hugoton field in southwestern Kansas to Kanawha County, West Virginia, has been postponed until August 31. The hearing was originally scheduled for August 18 at Washington.

According to the company's application the proposed facilities will include nine compressor stations, having an initial installed capacity of 68,000 hp. and will be capable of delivering at the eastern end 180,000,000 cu. ft. per day. At 100 per cent load factor, the new line would bring into the Appalachian area 65,700,000,000 cu. ft. of gas per year and at 90 per cent load factor, 59,130,000,000 cu. ft. per year. Through the installation of additional compressor stations, the application points out, the proposed facilities will be capable of delivering at the eastern end 240,000,000 cu. ft. per day. At 100 per cent load factor, this would bring into the Appalachian area 87,600,000,000 cu. ft. of gas per year, and at 90 per cent load factor the amount would be 78,840,000,000 per year.

FPC Combines Hearings On Cities Service Cases

WASHINGTON, D. C.—The Federal Power Commission last week directed the Cities Service Gas Co., Bartlesville, Okla., to file on or before September 1, 1943, new rate schedules for the transportation and sale of natural gas subject to the commission's jurisdiction which shall reflect a cut of not less than $4,445,871 below the company's 1941 operating revenues of $12,764,651 received from such transportation and sale. The new schedules are to become effective as to all bills regularly rendered on or after September 1 by the company which serves a wide area in northern Oklahoma, eastern Kansas, southern Nebraska and western Missouri.

The commission also ordered that hearing be held at 9:45 a.m., August 18, in the U. S. Courthouse, Kansas City, Mo., on an application filed by the Cities Service Transportation & Chemical Co., Ponca City, Okla. (a newly organized affiliate of Cities Service Gas Co.) for a certificate of public convenience and necessity to construct and operate a 26-in. natural-gas line extending aproximately 231 miles from the Hugoton gas field in Texas County, Oklahoma, to Cities Service Gas Co.'s Blackwell compressor station in Kay County, Oklahoma, and for related facilities to be constructed to handle gas to be delivered through the new line.

The application for certificate was filed 7 days after the commission issued an order citing the Transportation & Chemical Co., the Cities Service Gas Co., and the Cities Service Co. (top holding company) for failure to comply with the provisions of the Natural Gas Act and directing them to show cause at a hearing set for August 11 in Kansas City why an application for certificate should not be filed for the proposed line. In a concurrent order the commission postponed the show-cause hearing set for August 11 and consolidated that proceeding with hearing on the application for certificate set for August 18.

Arkansas' Sour-Gas Production Increasing

EL DORADO, Ark.—Production of natural gas from 20 gas fields in North Central Arkansas was 11,410,000 cu. ft. daily for June, as compared to 11,420,000 cu. ft. daily in May, it was reported last week by the Arkansas Oil and Gas Commission.

Production of sour gas from the oil and condensate fields showed an increase of 23,273,000 cu. ft. daily, the production during May being 103,201,000 cu. ft. and in June 126,574,000 cu. ft.

The 10 gasoline plants in southern Arkansas processed an average of 122,054,000 cu. ft. of gas daily, showing an increase of 21,656,000 from the 100,198,000 cu. ft., averaged daily during May. The bulletin stated that during June 2,900 bbl. of gasoline, 893 bbl. of butane and 31 bbl. of condensate were manufactured each day at the gasoline plants.

Recycling Operations

N.G.A.A. Begins Research Program on Sampling

An intensive research program will be started by the Natural Gasoline Association of America about August 23 in the Katy field near Houston, Tex., J. W. Vaiden, N.G.A.A. president and vice president of Skelly Oil Co., announced last week. This work is under the direction of G. G. Brown and D. L. Katz, University of Michigan, together with several of their assistants.

The main purpose of the work is to develop a satisfactory method for sampling a two-phase gas stream. Experiments will be carried out over a pressure range of 1,000 to 2,500 lb. per sq. in., on streams containing up to about 10 per cent liquid by volume, Mr. Vaiden said. Still other experimental work will be done on test methods for determining the specific gravity and the liquid content of these streams.

The general plan of the program was worked out by C. R. Williams, vice president for the high-pressure gas division of the association and several of the members of that division. A large number of oil companies interested in distillate-well operation are cooperating in the work.

Several Paloma Operators Endorse Unitization Plan

LOS ANGELES, Calif. — Developments indicate that Paloma will be California's most important distillate field.

Priorities were recently granted for construction of a cycling unit. The plant may be in operation within 6 to 8 months. The authority granted by PAW for this construction work has stimulated interest in the project with the result that additional operators are becoming members of the Paloma Operators Unit.

Recently Barnsdall Oil Co. joined the plan and along about the same time General Petroleum Corp. became a member and included the Gallagher, Houchin, Colm and Tupman properties and landowners' consent. Reports indicate that Union Oil Co. is preparing to become a member and it is likely that other operators within the probable productive limits will also become active members.

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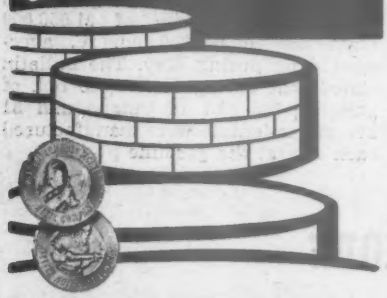

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REFINING

Frontier Accelerates Work on Aviation Plant

CHEYENNE, Wyo. — The pace of construction operations on Frontier Refining Co.'s new aviation-gasoline unit here has been increased appreciably in recent weeks in order to complete the work by the scheduled date of September 20.

A heavy increase in the receipt of important heavy materials, towers, pumps, valves, pipe and other essential equipment has been registered in recent weeks since a large part of the nation's aviation-plant projects were assigned the highest available priority rating, AA-1.

The government-financed aviation-gasoline unit is a $5,000,000 project and is one of the most advanced units of this type in the entire Rocky Mountain area. N. L. Edson, construction superintendent for Fluor Corp., is in general charge of the building operation. There are approximately 350 men now engaged in final stages of the construction project.

Other substantial improvements are being made concurrently to Frontier's refining facilities in order to provide desirable balance in charging stock for the new aviation-fuel unit. Three towers have been added, qualifying the plant to top nearly double its previous capacity. The cooling tower has been doubled in size. Another furnace and three more transfer pumps have been provided.

Sketches of Plant Operators

GORDON L. FARNED, for the past 8 years superintendent of the Baytown, Tex., refinery of Humble Oil & Refining Co., Houston, Tex., has been promoted to broader duties in manufacturing operations of the company and assigned the title of plants manager. He is succeeded as Baytown superintendent by James Harrop.

Mr. Farned's career with the Humble company began when he went to work in a pipe gang at Baytown.

From the pipe department, Mr. Farned transferred to the employment office, and a few months later into the accounting department. He became a member of the experimental laboratory at the time of its organization. When the lube oil agitators were put into operation, he took up new duties at that unit. Later he went to Texas City terminal to carry on special testing on crude oil pumped from the old Colony Creek refinery.

Returning to the Baytown laboratory, he carried on special work between the laboratory and the lube oil agitators. Later he went to Hearne as assistant superintendent of a new refinery where he eventually became superintendent. After that plant was closed down, he returned to Baytown as assistant to the assistant superintendent in charge of distillation.

Early in 1928 he went to Ingleside as superintendent in charge of construction and operations. In 1935 he returned to Baytown as superintendent in which capacity he served until he recently became plants manager.

A native of Russellville, Ala., where he was reared on a farm, Mr. Farned finished high school at West Alabama Agricultural School in Hamilton and received a scholarship to Auburn University. He worked his way through college.

He enlisted in the Navy in 1917 and after being mustered out in 1919, returned to Auburn and finished his college studies before joining Humble at Baytown in August 1920.

Coastal Plant Operations Deranged by Storm Damage

HOUSTON, Tex.—Coastal refinery operations were deranged this week as a result of the recent hurricane, which inflicted damage at various plants. It was said by plant managers that it would take a month or more in some cases to get back to normal operation. Cooling towers were particularly vulnerable. Both major companies and the smaller independents suffered. Ingenious devices were adopted to keep plants running at as high a rate as possible pending completion of repairs. One large refinery, with two towers down and the prospect of having to wait several weeks before replacement can be effected, is getting around its difficulty pretty well by adaptation of spray ponds.

One major refiner, with a Houdry unit out of commission and two cooling towers down, said:

"We've got operations adjusted now so that we are running the same volume of crude that we did before the storm hit us, but we are not able to make the same products, and it probably will be 6 weeks before we can get back to our old schedule."

The Pan American Refining Corp.'s plant was one of the few in the Texas City area that did not suffer serious damage. Its cooling towers were still standing when the storm subsided, and it reported that "only a few boards were blown off."

Top Priority Rating of AA-1 Assigned Associated Plant

Top priority rating of AA-1 has been assigned to Associated Refineries, Inc., in order to expedite construction and completion of the company's $12,000,000 aviation-gasoline plant south of Duncan, Okla.

Associated Refineries was organized several months ago by eight Oklahoma and North Texas manufacturing companies for construction of the plant.

Crude Runs Decrease at Eight Arkansas Plants

EL DORADO, Ark.—A decrease of 2,639 bbl. in the daily average runs of crude oil to stills of Arkansas' eight refineries during June was reported last week by the Arkansas Oil and Gas Commission.

Plants processed an average of 34,010 bbl. daily in June compared to 36,649 bbl. in May.

Army Adopts New Oil And Lubricant Buying Policy

WASHINGTON, D. C.—Purchases of the Army's requirements of engine oil and gear lubricant in the continental United States will be made in the future on Contract Bulletin 78, recently negotiated by the Fuel and Lubricants Division of the Quartermaster General's Office, the War Department announced last week.

Heretofore gear lubricants were purchased on War Department Supplement 1 to the Treasury Department's general schedule of supplies.

Changes in this procedure were made necessary by the critical shortage of certain additives.

Increasing output of additives is expected to make it possible to relax close control by the year's end.

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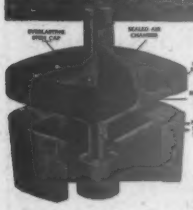

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PIPE LINES

Oil Stream Approaches WEP Phoenixville Station

The head of the stream of East Texas crude being pumped eastward from the War Emergency Pipelines, Inc., Norris City, Ill., station through the 24-in. line, is due to reach the Phoenixville, Pa., station August 13. Stations 16 and 21 are in operation and Station 25 at Phoenixville is ready to function.

Connections to the Linden, N. J., tank farm, and to Standard Oil Co. of New Jersey tanks, Cities Service Oil Co. and Sinclair Refining Co. dock lines and the Socony-Vacuum Oil Co., Inc., tank farm are practically completed. Owing to difficulties encountered in traversing highly developed sections of Bayonne, N. J., there has been some delay in completing the line to serve the Tide Water Associated Oil Co. refinery.

After the 24-in. line across the Arkansas River was put in operation, throughput rose to 13,500 bbl. per hour, equivalent to 324,000 bbl. daily. Because of supply conditions affecting the coordination of shipments into the line with tank-car movements from the Norris City terminal, the line continues to function considerably below the high capacity which can be attained in spite of pump packing troubles, which are now much reduced, and in spite of interruptions due to electric storms.

Not more than 90,000 bbl. of No. 2 heating oil is in sight for the first batch of this product scheduled to go through the line next month.

A few miles of 8-in. and 12-in. pipe have been laid in East Texas to facilitate handling of WEP batches of Southwest Texas and West Texas crude.

Negotiations are in progress to arrange for feeder lines to bring refined products from the Continental Oil Co. and Cities Service Oil Co. refineries at Lake Charles, La., to the WEP 20-in. products line.

Construction of the 20-in. line will probably be completed from Beaumont, Tex., to Norris City, Ill., about September 15. Laying of feeder lines across the Houston, Tex., ship channel is being delayed by difficulty in obtaining dredges. Building of stations for the 20-in. line is going ahead at all locations between the Gulf Coast and Norris City. There has been some difficulty in getting materials owing to the fact that WEP obtains supplies on a rating no higher than AA2. Building of stations for crude-oil stations east of Norris City is well along; in this same section, construction of stations for the refined products line will start the latter part of the month.

Reconditioning Proceeds on Southwest Emergency Line

For reconditioning the 150-mile 14-in. and 16-in. line to be converted from natural gas service to provide a crude-oil outlet for the Corpus Christi, Tex., producing area, toward Houston, Tex., Williams Brothers Corp. has two gangs in the field. Work is being done for Southwest Emergency Pipe Line, Inc., under the supervision of Humble Pipe Line Co.

After uncovering the pipe, each joint is taken to a yard where it is cleaned, inspected and double jointed. After being welded to the line, the pipe is coated and wrapped by traveling equipment to a large extent. Part of the pipe for the system is taken to a yard in Houston, Tex., for special coating application where conditions demand.

Operations were delayed by the Gulf Coast hurricane on July 27 and during the rains which followed. At the beginning of the month nearly 36 miles of pipe had been relaid, including the 10-mile section on which experimental operations were carried on before authorization was granted for all of the work.

Construction Is Under Way On Sinclair's Toledo Line

Most of the right-of-way has been procured for the 250-mile 8-in. products line of Sinclair Refining Co. between Chicago, Ill., and Toledo, Ohio.

Early this month 21 miles had been laid. Pipe is obtained by removal from the Sinclair crude-oil system in Kansas and Oklahoma.

Standard Oil of Louisiana Completes 109-Mile Line

The 109-mile line consisting of 10-in., 8-in. and 6-in. pipe for moving crude oil from the Golden Meadows field to Anchorage (Baton Rouge, La.) has been completed for Standard Oil Co. of Louisiana. At the beginning of this month pipe was being laid for

lateral lines to pools adjacent to the new line.

Magnolia Surveys Route For Apco-Warner Outlet

Prospects of a new pipe-line outlet for the Apco-Warner pool of northern Pecos County, Texas, are seen with the report that the Magnolia Petroleum Co. is surveying for a pipe line between that sector and the Abell pool, Texas. Both are producing from the Ordovician.

The proposed line would be 12 miles long. The Apco-Warner pool now is served by the Comanche Pipe Line Co.

Agitation Spreading for Rockies-Pacific Coast Line

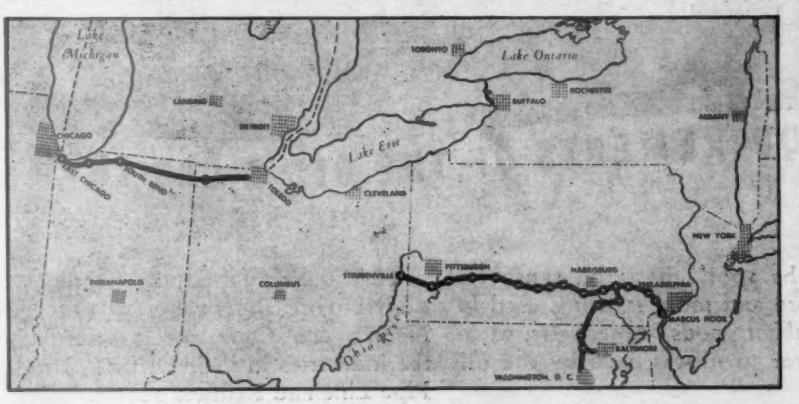
DENVER, Colo.—Proposals looking to federal aid in the construction of a pipe line from the Rocky Mountain area to the Pacific Northwest are expected to come up for consideration in Washington, D. C., when Congress reassembles. While no concrete plans have been made public, the subject is being widely discussed and has been referred to frequently at gatherings of oil men here in the past few weeks.

To supply Washington, Oregon, Alaska, the western Canadian markets and the Orient from this area is advocated in place of moving oil to the East. For such a program there is a desire to have Defense Plant Corp. finance a 20,000-bbl. refinery on the Columbia River, where the Rocky Mountain crude would be processed into consumer products.

McAllen, Tex., Line Approved by WPB

War Production Board approval for construction of a pipe line from McAllen, Tex., to a main line with access to five oil fields in Hidalgo and Starr counties, Texas, has been announced by Rado Refining Co.

The 5-mile 6-in. line will connect with Continental Pipe Line Co.'s main line and will be in operation in 40 to 50 days. Cost is reported to be estimated at $50,000.



Refined products lines of Sinclair Refining Co. on which construction is now under way. Work is progressing on the Chicago, Ill.-Toledo, Ohio, and the Steubenville, Ohio-Marcus Hook, Pa., lines. Construction of a crossing at the Susquehanna River is scheduled for a lateral serving Baltimore, Md., and Washington, D. C.

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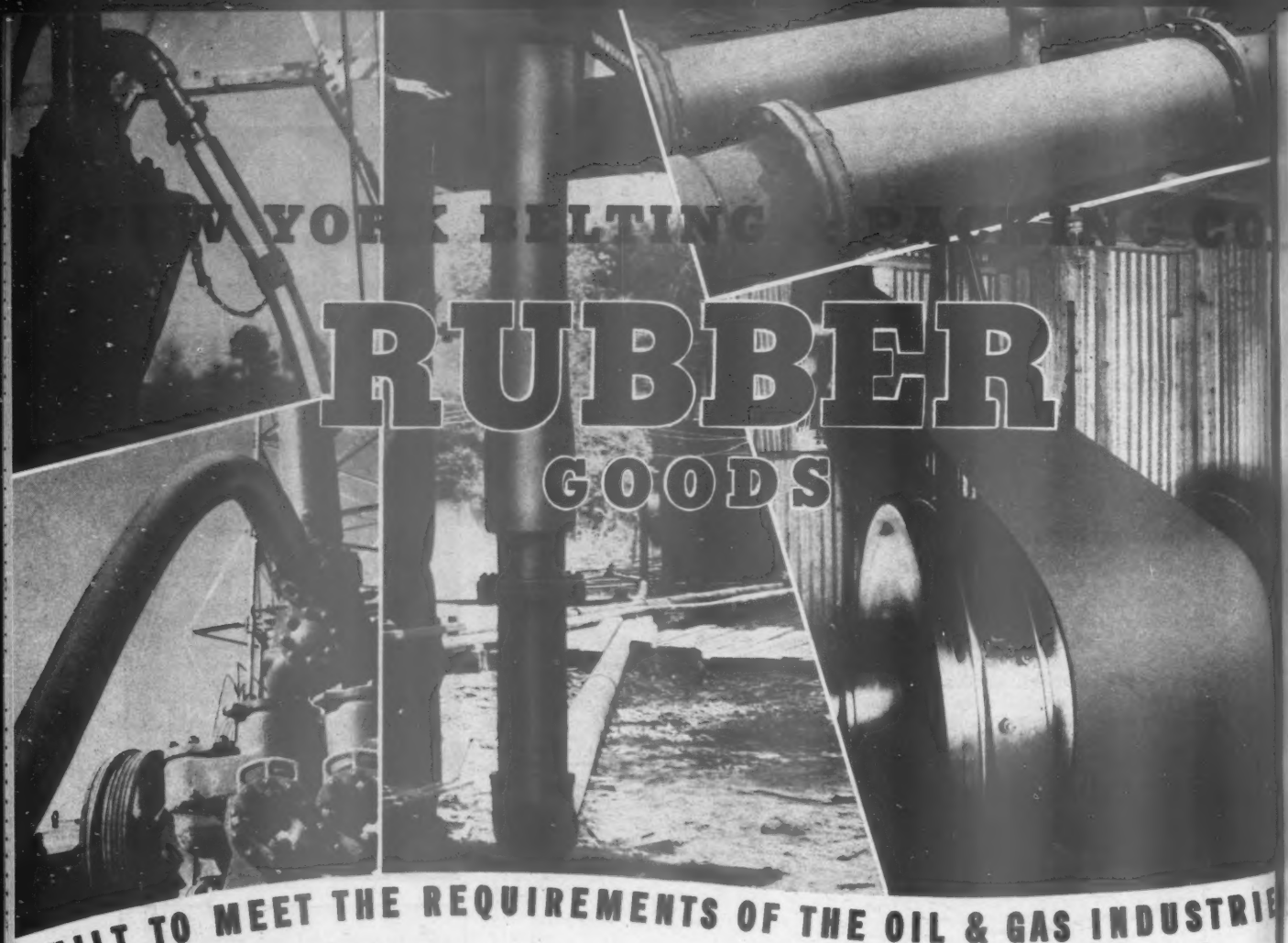

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Exploration and Drilling

Week's Highlights

THE future of Illinois as a state where big fields may yet be opened—fields of the size of Salem and Louden—is regarded with pessimism by oil producers and executives operating in that state. Nevertheless wildcatting goes on in many counties, with small new pools reported almost weekly, but the dry hole average is increasing steadily.

Illinois' biggest year as an oil state was 1940. In that year 3,049 oil wells averaging in initial production 617.4 bbl., were completed. The dry holes represented less than 20 per cent of the whole number of wells completed. Last week's report of completions showed 17 new oil wells and 18 dry holes. The average initial production of the oil wells was 112 bbl.

Some years ago The Oil and Gas Journal in an effort to show the evils of unbridled crude-oil production, published a list of pools with their peak production and the output of the same fields 1, 2 and 3 years later. Fifteen great fields thus listed showed declines ranging from 64 to 99 per cent in 3 years.

We can now add the Salem field in Marion County, Illinois, which has fallen from a high of 258,499 bbl. in March 1940 to an average of 29,442 bbl. per day in the first half of this year, a decline of 88.6 per cent. Its current production is about 29,250 bbl. per day.

The above noted fields produced all the oil the pipe lines would handle. There was little if any attempt at curtailment to preserve reservoir energy. As far as Illinois is concerned the only field in which any semblance of conservation was observed was the Louden area, in Fayette County, where a limit per well was placed on the pipe-line runs by the leading purchasing company. Louden had a peak production of 74,320 bbl. in May 1940, and 3 years later was producing an average of nearly 40,000 bbl. per day. Three years ago it ranked a poor second to Salem, but late in 1941, with Salem rapidly falling, and Louden declining gradually, the latter field became the largest producer in the state, which position it now holds.

Production of Illinois was about 12,200 bbl. per day when the first of the basin fields began to produce in 1937. It rose to 400,139 bbl. as the daily average for the year 1940. In June of that year the peak came when the daily crude output exceeded 500,000 bbl. per day for a part of the month, and an average of 499,000 bbl. per day for the whole month.

OHIO: Morgan County, an old producing area, has a new pool in Section 24, Bloom Township, the well starting at 104 bbl. from Clinton sand at 4,144-98 ft. (p. 106).

OKLAHOMA: Viola lime production in the East Tecumseh pool was extended a mile northeast, the test flowing 44 bbl. per hour through 1-in. choke (p. 90).

WYOMING: The Little Buffalo Basin structure in the Big Horn basin will have two Tensleep sand tests in action this summer. The field is an old gas area producing from Frontier sands at 1,700 ft. Another Elk Basin field is within the possibilities of the prospective tests (p. 97).

MICHIGAN: F. R. Frye, state petroleum engineer, tells operators that Michigan is producing only 20 per cent of the state's oil requirements. He urges greater search for new fields (p. 94).

NORTH TEXAS: Four pools were opened, two in Young County and one each in Archer and Wilbarger counties. One of the Young County discoveries flowed at the rate of 792 bbl. per day, the other at 212 bbl. per day (p. 100).

COMPLETIONS IN ALL FIELDS . . .

(Week ended August 7, 1943)

	Oil	Gas	Dry	Total	Footage	Total comp. to date 1943	1942
N. Y., Penna., W. Va.	58	13	8	79	148,934	1,999	2,090
Ohio	4	10	8	22	55,439	507	696
Indiana	2	0	2	4	6,302	135	198
Kentucky	3	1	4	8	12,705	223	131
Illinois	17	0	18	35	93,255	1,020	989
Michigan	6	1	3	10	28,671	318	414
Kansas	26	1	15	42	139,569	953	901
Nebraska	0	0	0	0	0	18	23
Missouri-Iowa	0	0	0	0	0	9	9
Oklahoma	10	0	15	25	79,770	665	750
Texas:							
North Central Texas	18	1	42	61	105,707	808	695
West Texas	14	0	3	17	78,685	491	819
Texas Panhandle	4	0	3	7	25,024	107	240
Eastern Texas	3	0	5	8	49,303	161	246
Texas Gulf Coast	3	0	5	8	47,700	257	470
Southwest Texaxs	16	1	7	24	124,090	535	711
Total Texas	58	2	65	125	430,509	2,359	3,281
North Louisiana	3	3	3	9	35,624	188	283
Louisiana Gulf Coast	4	0	4	8	72,346	219	314
Total Louisiana	7	3	7	17	107,970	407	597
Arkansas	1	0	0	1	3,534	142	97
Mississippi and Southeast	0	0	0	0	0	55	32
Montana	1	0	1	2	5,674	117	108
Wyoming	4	0	0	4	19,469	71	58
Colorado, Utah	4	0	2	6	7,598	16	11
New Mexico	2	0	3	5	18,043	128	148
California	28	0	2	30	115,993	756	457
Total United States	231	31	153	415	1,273,340	9,898	10,929
Total previous week	198	28	122	348			
Week ending Aug. 8, 1942	194	49	101	344			

CALIFORNIA

Fresno Discovery Opens West Raisin City Pool

LOS ANGELES, Calif.—A new oil field was chalked up in California this week, approximately 1 mile west of the Raisin City pool, Fresno County, through the joint efforts of Seaboard Oil Co. Tide Water Associated Oil Co. and Union Oil Co.

The discovery well, a joint operation by the three companies, was brought in flowing 436 bbl. of clean 24.6-gravity oil through a 14/64-in. bean from the Eocene. The new field, tentatively designated as West Raisin City, failed to show commercial production in the overlying Miocene. The discovery well, 1 S.T.U. in 14-15s-17e, found one gas zone in the Miocene and one gas zone and an oil zone in the Eocene but the Cretaceous was barren. The Miocene gas zone found at West Raisin City corresponds with that hit by Shell at East Raisin City in the Miocene at approximately the same depth.

The East Raisin City field is characterized by a marked unconformity in subsurface formations due to lenticularity and conspicuous depositional changes. Both fields show relatively thin productive measures. In the discovery well at West Raisin City the log shows 12 ft. of fair oil sand at 6,285 ft., 13 ft. of good oil sand at 6,297 to 6,310 ft., 8 ft. of poor oil sand at 6,310-18 ft. and 32 ft. of gray sand at 6,318-50 ft.

The joint holdings of Seaboard, Tide Water and Union in the West Raisin City area cover approximately 2,200 acres.

The general area in which the new discovery lies encompasses the Helm, Riverdale, Raisin City and Wheatville fields. Over the county line in Madera County, Texas Co. has developed commercial production of natural gas in the Mendota field. Helm has been declared a condensate field but it remains to be seen whether it is a true distillate field or an oil field with an extensive gas cap as some believe. The Riverdale field has been extended during the past year by continuous drilling by Amerada Petroleum Corp. but it has not shown substantial production. The field contains several productive measures extending through the Miocene and Eocene. Oil pays are thin but show favorable permeabilities.

Fresno County.—Standard Oil Co. completed another flowing well in the Pleasant Valley field this week when 28-21-F was brought in flowing 817 bbl. of clean 28.6-gravity oil through a 14/64-in. to 28/64-in. bean from the Gatchell zone of Eocene age. This well extends the productive limits of the Pleasant Valley field about 1,000 ft. east and proves up several additional locations. This is the third well at the intersections of Sections 20, 21, 28 and 29 in 20s-16e. The fourth well will be drilled by Standard Oil Co. on property leased from Pleasant Valley Farming Co. in Section 28-20s-16e. The most northerly well in the Pleasant Valley field to date, R. S. Lytle 86-20-F is drilling ahead in the Kreyenhagen and should reach the pay within another several days. This well appears to be running higher structurally than other completions to date.

Standard of California is preparing to drill its first wildcat in the Jacalitos district of Fresno County, in 31-21s-15e. After this wildcat has been drilled, the company will shift the crew to 30-21s-15e where a location has been staked for a wildcat on the Wells Fargo property.

Union Oil Co. has abandoned its second East Coalinga outpost and will probably discontinue further exploratory work in that area for the present. Standard of California, however, is preparing to drill an Eocene test in 17-21s-15e, where there is some indication of a probable shore-line accumulation similar to that found in the Pleasant Valley and Coalinga Nose fields.

Orange County.—The Huntington State Co. successfully finished its first tideland well at Huntington Beach on property leased from the State of California. The surface location is on the uplands back of the tide line and the objective was reached by directional drilling. This well was brought in flowing 240 bbl. daily. It is in the extreme western end of the field and is the first of about 30 available locations. Production is coming from the Jones sand of Pliocene age.

Directors of the Huntington State Co. organized recently are H. R. Hamilton, F. E. Fairfield, Thomas H. Sherman and O. C. Field.

Coastal District

Los Angeles County.—Two new wells are expected to be completed in the Aliso Canyon field within the next 2 weeks and both will further indicate the potentiality of this field. The most important of the two wells is Standard of California 1-2 Sesnon as it will extend the western limits, if productive.

This section of the state is one of the most promising from an exploration standpoint. In the Del Valle field, also in the Aliso Canyon region, several drilling wells are proceeding to the Modelo of Miocene age. One of the key wells at Del Valle is Jack Herley and Paul Kelley 1 Orduno which is on the northwest end of the structure. If this test proves productive it will extend the field's limits.

Barnsdall Oil Co. is proceeding with normal development work in the Newhall Potrero field another district in the coastal group of fields and having finished two wells this week the company is preparing to start two others.

Ventura and Santa Barbara counties.—The most interesting feature in connection with present and projected development work in Ventura and Santa Barbara counties is the large number of leases taken by Standard of California during recent months. Acquisition by the company in Ventura County exceed the combined leases taken by all other operators during the same period. The company is drilling tests in the Fillmore and Piru district of Ventura County and has already drilled several wildcats in Santa Barbara County. Principal activities of the Union company in the Coastal district consists of work at Cat Canyon and Santa Maria Valley in proven areas and deepening of a test in Torrey Canyon. Shell Oil Co., Inc., has suspended drilling operations for a second time in the Rincon district at the western end of the major Ventura anticline. Shell 1 Tomson, which was

DAILY AVERAGE PRODUCTION FOR WEEK

	Aug. 7 crude oils	July PAW quota all oils*	July 31 crude oil
Arkansas	76,855	75,500	77,400
California	783,500	830,000	766,250
Colorado	6,500	7,000	6,500
Eastern fields	106,300	111,500	100,150
Illinois	218,900	222,800	215,500
Indiana	13,900	14,000	14,100
Kansas	277,700	300,000	306,180
Louisiana	352,120	356,300	349,050
North Louisiana	*83,620*	.....	*84,550*
Louisiana Gulf Coast	*268,500*	.....	*264,500*
Michigan	55,450	60,100	57,300
Mississippi	48,395	50,000	53,250
Montana	24,350	23,300	21,975
Nebraska	2,200	2,100	2,200
New Mexico	103,900	110,000	104,000
Oklahoma	329,900	347,000	333,500
Texas	1,702,750	1,817,000	1,616,750
East Texas	*371,000*	.....	*371,100*
West Texas	*258,400*	.....	*246,650*
North Central Texas	*129,800*	.....	*138,000*
East Central Texas	*140,400*	.....	*128,400*
Texas Panhandle	*90,300*	.....	*90,500*
Texas Gulf Coast	*624,250*	.....	*559,900*
Southwest Texas	*88,600*	.....	*83,200*
Wyoming	105,265	98,000	96,500
Total United States	4,208,025	4,424,600	4,121,175

Total production Jan. 1-Aug. 7, 1943 ..... 865,880,875 bbl.
Same period last year ..... 825,386,990 bbl.
*Includes 245,000 bbl. daily average of natural gasoline and associated products.

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When the war is won and we return to peace time pursuits there will still be a big job to do in rehabilitating a broken world. People everywhere will look to America. Our business men and leaders will have a great responsibility and a great opportunity. In keeping with this thought the Mission Manufacturing Company is planning many advancements and improvements in its products for the benefit of oil men who will be busy to a degree never before experienced. In the meantime war comes first.

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originally bottomed at 9,704 ft., and then redrilled to 8,670 ft. after the hole had been whipstocked, again is shut down.

IMPORTANT COMPLETIONS

Raisin City, West, Fresno County: Seaboard, Tide Water Associated, Union 1 S.T.U., 14-15s-17e, flowed 436 bbl., 24.6-gravity, 0.4 per cent cut, 140,000 cu. ft. gas, 14/64-in. bean, pressures 840/900 lb., T.D. 6,406 ft., 7-in. casing cemented 6,380 ft., gun perf. 6,290-6,305 ft., bottomed in Cretaceous, producing from Eocene, form. test of Miocene 5,002-29 ft., flowed 15,000,000 cu. ft. gas, no oil. form. test of Eocene 6,235-68 ft., flowed 18,000,000 cu. ft. gas, no oil, bottom-hole pressure 2,100 lb., 12 ft. fair oil sand 6,285-97 ft., 13 ft. good oil sand 6,297-6,310 ft., 8 ft. poor oil sand 6,310-18 ft., 32 ft. gray water sand 6,318-50 ft., discovery well in new field 1 mile west of old Raisin City field.

Round Mountain, Kern County: Trico Oil & Gas Co. 1 Ward, 30-28s-29e, abandoned in gray sand below Vedder zone of Miocene age, T.D. 2,856 ft., no oil or gas showings logged.

OKLAHOMA

Medrano Sand Production Extended at Cement

AT the end of last week, Gulf Oil Corp. 1 Sherritt, SE NW NE 33-6n-10w, was showing for a 2-mile west extension well in the Medrano sand zone of the Cement pool. The well ran some 70 ft. higher on the sand than the nearest producer, topping sand at 5,770 ft. Shows of oil and some porosity was revealed in cores taken at 5,814-45 ft. and at 5,845-61 ft., total depth. Production tests had not been made on last report. East of this well, Anderson-Prichard Oil Corp. 1 Hayes, S½ SE SE 35-6n-10w, found the sand at 5,425-88 ft., set pipe at 5,527 ft. and averaged a little better than 8 bbl. of oil an hour for 12 hours, along with 1,390,000 cu. ft. of gas a day.

Deep test sets pipe.—Denver Producing & Refining Co. 1 Sah-Cam, SE SE 33-10n-10w, set 5-in. casing on bottom at 13,750 ft. and is preparing to drill in at around 13,773 ft., old total depth, with rotary tools. Showings of oil and high-pressure gas were found at this depth when originally drilled. Operators are confident of an oil well at this depth, which would make it the world's deepest producer.

Pottawatomie County. — Atlantic and Crosbie 1 Chilcoat, SE NW SE 10-9n-4e, extended Viola lime production a mile northeast of the East Tecumseh pool. On production tests, delayed by lack of storage tanks, the well flowed 44 bbl. of oil in 1 hour through 1-in. choke. Perforations were at 4,508-14 ft., with total depth at 4,718 ft. Location is directly between the same interests' 1 Turner in 1-9n-4e, and Tecumseh and north of the Hotulke area. Production here will open a vast area for further drilling as there are no defining dry holes on the north side of the Hotulke, nor on the west side of the Earlsboro pools up to the Turner well.

OKLAHOMA WILDCAT COMPLETIONS

Coal County: Mid-Continent and Delaney 1 Bowlby, NW SE SE 14-3n-9e, dry, T.D. 3,802 ft., coal 2,210 ft., Atoka 2,350 ft.

Kay County: Aladdin Pet. 1 School Land, NE SE SW 16-29n-3e, dry T.D. 3,695 ft., Layton 2,040 ft., Burbank 3,230 ft., Simpson 3,649 ft.

Okfuskee County: Amerada 1 Barton, SE NE SE 7-11n-11e, dry, T.D. 3,885 ft., Cromwell 3,065 ft., Hunton 3,624 ft., Wilcox 3,810 ft., show oil and gas at 3,804 ft.

Wood Oil 1 Winn, NE NE SE 28-11n-11e, dry, T.D. 3,840 ft., Cromwell 3,045 ft., Hunton 3,665 ft., Wilcox 3,835 ft.

McIntyre et al 1 Thompson, NE SW 33-11n-11e, dry, T.D. 3,895 ft., Gilcrease 2,715 ft., show oil and gas, Hunton 3,672 ft., Wilcox 3,890 ft.

Okmulgee County: H. B. Young, NE NE SW 35-13n-13e, dry, T.D. 2,141 ft., Booch 1,450 ft., Dutcher 1,864 ft.

Payne County: Olson Oil 1 Thompson, NW SE NW 35-18n-5e, dry, T.D. 3,975 ft., Bartlesville 3,352 ft., Viola 3,866 ft., dolomite 3,905 ft., second Wilcox 3,949 ft.

Roger Mills County: Stanolind 1 Doughty, SE SW 29-3n-21w, dry, T.D. 4,113 ft., Cisco 1,580 ft., Canyon 3,010 ft., Arbuckle 4,058 ft., slight porosity, on shows.

Seminole County: Joel Scroggins 1 Mesab, NW NE NE 31-6n-6e, dry, T.D. 2,705 ft., coal 2,048 ft., Senora limes 2,140 ft. Pennsylvanian Caney 2,556 ft.

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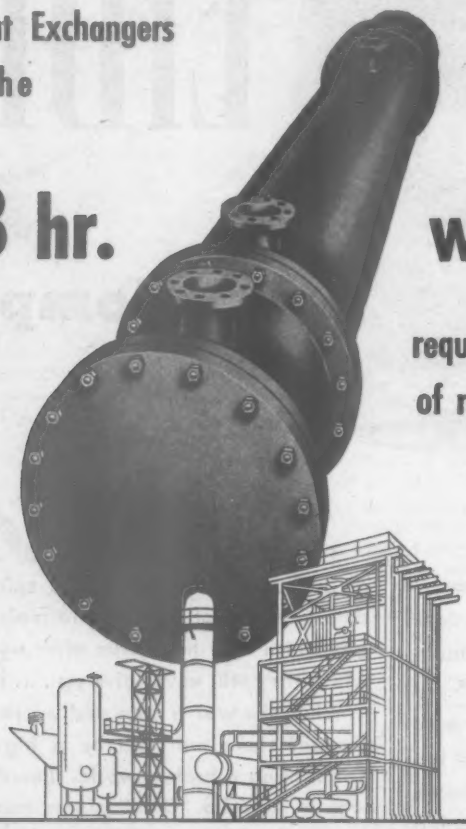

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PERMIAN BASIN

Sunray-Wright Extension May Link Slaughter Pool

MIDLAND, Tex.—Possible linking of the Slaughter pool of Cochran and Hockley counties, largest field in Texas outside of East Texas, with two smaller areas of Cochran County was apparent by developments last week.

The Sunray-Wright pool, consisting of one well, was extended almost a mile southeast, in the direction of the Slaughter field, by Sunray Oil Co. 1 Vaughn-Dean, southeast corner Labor 2, League 59, Martin County School Land, which is less than 3 miles northwest of the Bieg-Wright lone producer in Labor 12, League 60. The Bieg Oil Co. well is offset to the south by a dry hole, and another dry hole in the vicinity is Wiggins & Hyde 1 Dean, northwest corner League 58, Martin County School Land, but it was drilled in 1937

One and one-quarter miles north of production in the Slaughter pool, Superior Oil Co. has staked location for 21 Dean, in the southwest corner of Labor 22, League 60, Martin County School Land, 1¼ miles south of the Bieg producer, which if successful will cause further drilling in the link area. It is possible that the Bieg and Sunray wells are on a "finger" of the main Slaughter structure extending in a northwesterly direction. Recent developments also indicate that the Dean pool, 3½ miles west of the Slaughter field, may also be on a "finger" of the main structure. Stanolind Oil & Gas Co. 5-A Dean, Labor 24, League 92, ½-mile southeast extension, assured production when it flowed 44 bbl. oil in 2½ hours from 76 ft. of pay topped at 4,972 ft., and five new locations were staked on the west side of the Slaughter area.

Yoakum County.—Linking of the Wasson and Waples-Platter pools seemed assured when Tide Water Associated Oil Co. 1 Waples-Platter, most northeasterly well in the Slaughter field and ¾ mile southwest of nearest producer of the Waples-Platter pool showed for a good well after acid treatment of 10,000 gal. at total depth 5,317 ft.

Deep Wildcats

Andrews County.—Union Oil Co. of California 1 Biles, Section 19, Block A-31, Public School Land, Clear Fork lime prospect northwest of the Fullerton pool, was drilling ahead near contract depth of 7,400 ft. after coring slight porosity from 7,370-80 ft. Porosity and saturation had been drilled from 7,262-92 ft., and a drill-stem test from 7,029 to 7,310 ft. showed 240 ft. of oil-cut mud. Northeast of the Fullerton pool, 1½ miles, Bay Petroleum Co. staked location for 1 Bitler & Lowe, 660 ft. from south and west lines of N½ Section 12, Block A-32, Public School Land.

Menard County.—C. H. Murdick has staked wildcat location for 1 G. S. Allison, 1,320 ft. from south and east lines of a 539-acre lease in the A. Merkoeter Survey, Section 248.

WEST TEXAS WILDCAT COMPLETIONS

Pecos County: Standard Oil Co. 1 Douglas Oil Co. et al. 660 ft. from S & E, Sec. 9, Blk. 194, G.C.&S.F. Ry. Sur., top Simpson 7,730 ft., S.O. 8,650-8,731 ft., Ellenburger 8,734 ft., P.B. 8,800 ft., perf. 125 shots 8,870-80 ft., P.B. 8,733 ft., perf. 8,697-8,717 ft., acid, dry, T.D. 9,115 ft.

Reeves County: L. H. Wentz 1 Joe Rounsaville, 750 ft. from N, 700 ft. from E Sec. 23, Blk. C-13, Public School Land elev. 3,635 ft., S.O. in Castile 3,095 ft., gray lime 4,122 ft., Delaware lime 4,130 ft., Delaware sand 4,357 ft., black lime 4,355 ft., gray lime 4,777 ft., dry, T.D. 5,008 ft. lime.

PANHANDLE WILDCAT COMPLETIONS

Armstrong County: Stanolind Oil & Gas 1 G. A. Corbin, 660 ft. from S & E, Sec 275, Blk. B-74, H.&G.N. Ry. Sur., 7 mi. S of Claude, dry, T.D. 6,120 ft., granite

SOUTHEAST NEW MEXICO

HOBBS, N. M.—Attempt to put

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on production will be made after drilling 10 ft. more lime pay in McLaughlin and Cosden Petroleum Corp 1 Shell-State, NW NE 7-17s-33e, discovery prospect 2 miles northeast of Maljamar pool in western Lea County. The well is bottomed at 4,170 ft., from which depth the hole filled with oil several weeks ago. After pulling 7-in. casing, 5½-in. pipe was cemented at 4,152 ft., and the deepening was to be done with 3,000 ft. of water cushion to prevent possible blowout. Midway between this well and the one-well Phil-Mex pool, Phillips Petroleum Co. has made location for a semiwildcat in NW SE 17-17s-33e, 2 miles northeast of nearest producer of the Maljamar pool.

SOUTHEAST NEW MEXICO WILDCAT COMPLETIONS

Lea County: Skelly Oil 1-T State, SE SE Sec. 10-21s-34e, dry, T.D. 4,075 ft.

APPALACHIAN FIELDS

Mercer County Test Flows Gas While Drilling Ahead

PITTSBURGH, Pa. — In western Pennsylvania, a deep test in Mercer County is through the Oriskany and Newburg and carrying about 70,000 cu. ft. of gas from the latter. In Cumberland Township, Greene County, there is a second Dunkard sand oil well. In West Virginia, an important test in Wirt County reached the Corniferous lime and it appears running well on structure.

SOUTHWEST PENNSYLVANIA

Mercer County.—In Worth Township, United Natural Gas Co. is drilling the test on the Maude Davidson farm at 6,010 ft. with the Onondaga lime at 4,047 ft.; Oriskany 4,171-72 ft.; and about 70,000 cu. ft. gas at 5,378-99 ft.

WEST VIRGINIA

Wirt County.—The important deep test of the Columbian Carbon Co. on the Virgie Mason farm in Tucker district, topped the Corniferous lime at 5,117 ft. and at 5,152 ft. ran 6⅝-in. casing. This test is located on the Belleville Quad, 2.65 miles west 80° 30 minutes and 2.73 miles north 39°. It is west of the test on the Caplinger farm which was drilled on the Burning Springs anticline and which found the Oriskany sand hard and unproductive. The Corniferous lime in the Caplinger test was placed at sea level minus 4,292 ft., against sea level minus 4,219 ft. in the new test. In spite of normal thinning to the west, the new test appears to have run sufficiently high.

Boone County. — In Peytona district, Owens, Libby-Owens Gas

(Continued on Page 101)

CANADIAN FIELDS

Work Resumed in Old Wells East of Turner Valley

CHATHAM, Ont.—On the Aldersyde structure, east of Turner Valley, operations have been resumed by Maynard J. Davies and associates who are completing two unfinished tests. Ranchmen's 1, which will in future be known as New Ranchmen's Bird 1, LSD 16, 13-20-29w4, is resuming this week from 7,240 ft. This test, started in 1928, has been standing in the Dalhousie sand since 1941. It has several oil shows grading as high as 73 B., with black crude at 6,700 ft., green crude at 7,130 ft. and a dark red 52-gravity crude at 7,174 ft. in addition to numerous wet-gas shows. The well will be deepened to test the Madison limestone, which should be reached in a few hundred feet. Cable-tool equipment at New Ranchmen's-Snider 1, LSD 16, 34-19-29w4, standing at 1,770 ft., is being dismantled and heavy-duty rotary equipment will be rigged to carry the test to the Madison limestone, expected around 8,000 ft. Newell & Chandler of Calgary have the contract. Officers of New Ranchmen's Oil Co. are: President and managing director, Maynard J. Davies; secretary, Basil O. Jones; treasurer, R. C. Carlile; director, E. C. Shaughnessy.

Taber.—In the Taber field, southern Alberta, Dominion Oils 37-18B, LSD 15, 18-9-16w4, is still adjusting pumping equipment to overcome sanding, but tests have indicated around 200 bbl. daily, comparable with the discovery well, Taber-Province 1, which has been pumping 200 to 240 bbl. daily. Dominion 57-18-B, LSD 5, 17-9-16w4, finished at 3,184 ft., had a brief drill-stem test when oil rose 600 ft. in the hole. Casing has been set for a definite test, with indications of a good producer. Dominion Oils will drill a new well immediately north of 37-18, and also a wildcat test of an outlying area to the south in Township 8-18w4.

Jumping Pound.—In the Jumping Pound area west of Calgary, Shell-Norman 1 deep test, LSD 5, 22-24-5w5, is in the Kootenay formation below 10,784 ft., and expected to get the Madison limestone around 11,000 ft. The well is the deepest test yet drilled in Canada.

Athabaska.—In the Athabaska field in northern Alberta, Deca 2, LSD 3, 16-66-23w4, bottoming at 1,687 ft., has been shut in after flowing at an estimated rate of around 6,000,000 cu. ft. daily. An official test is to be made by the Alberta government.

Prince Edward Island.—Hugh Mackay and associates are starting a deep test for oil and gas in the bed of Hillsboro Bay, opposite Charlottetown, Prince Edward Island.

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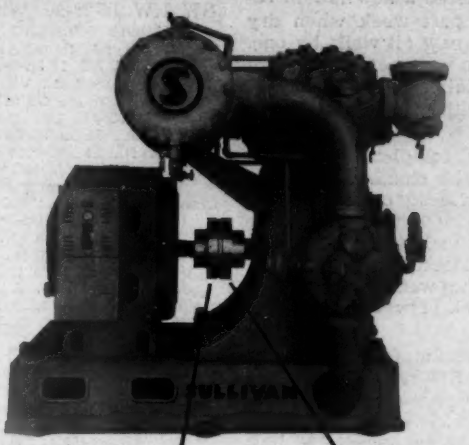

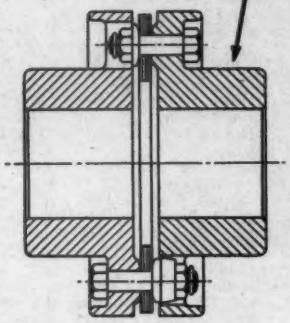

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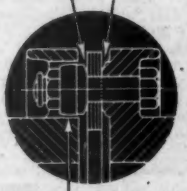

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ILLINOIS

New Pools in Prospect in Week of Many Dry Holes

ILLINOIS suffered a new low in results in the past week when dry holes exceeded new oil wells by one. Seventeen wells were completed with an average initial production per well of 112 bbl. Eighteen dry holes were reported.

Several near completions gave a silver edge to the cloud. One of the 11 completed wildcats opened a pool. It was Magnolia Petroleum Co. 1 Newell-Badgett in 18-3s-3e, about 2½ miles south of Mount Vernon, Jefferson County. The well made 60 bbl. of oil and 19 bbl. of water from Aux Vases sand.

Phillips Petroleum Co. 1 Laura B. Johnson, C SW SW 19-4s-11e, an outpost to the Phillipstown pool in White County, swabbed 394 bbl. of oil and 23 bbl. water and later flowed 194 bbl. oil and 18 bbl. water at a total depth of 3,151 ft. It was being put on the pump.

What may be an extension to the Maplegrove pool in Edwards County, Ryan & Fortner 1 Ralston, C E½ SW SE 9-1n-10e, flowed 503 bbl. of oil from pay at 3,270-72 ft. which had been shot. It was then acidized and the well flowed 358 bbl. in 8 hours and 500 bbl. in 20 hours but died and was being put on the swab. Total depth is 3,340 ft. The Maplegrove pool was opened in Section 4.

Shell Oil Co., Inc., 1 Laura Thrapp in SW SW NW 29-1n-12, found McClosky lime at 2,326-36 ft. and the well made 207 bbl. of oil and 120 bbl. of water in a pumping test.

New wildcats started during the week include Holbert & Heath 1 Carnes, NW NE NW 35-11n-4e, Shelby County; J. H. Hudson 1 Feller, SE NW SE 23-6n-3e, Effingham County; Skelly Oil Co. 1 L. B. Stricker, SW SW SE 24-5n-1w, Fayette County; Superior Oil Co. 1 H. Hinterscher, NE SE NW 11-4n-8e, Clay County; T. M. Conrey 1 Branat, NW NE SW 11-3n-3w, Clinton County; Pure Oil Co. 1 Kast-A, NE NE NE 24-1n-7e, Wayne County; Holbert & Heath 1 Richardson, C NW SE 31-2s-5e, Wayne County; C. E. Paulitis, SW SE NE 13-6s-7e, Hamilton County; A. H. Anderson 1 S. F. Knight, SW SW NW 15-7s-9e, White County.

ILLINOIS WILDCAT COMPLETIONS

Clay County: National Assn. Pet. 1 Kincaid, NW NE SE 17-5n-6e, dry at 2,773 ft., Menard 1,990 ft., Vienna 2,094 ft., Glen Dean 2,200 ft., Golconda 2,270 ft., Barlow 2,363 ft., Cypress 2,408 ft., Benoist 2,537 ft., Renault 2,584 ft., Aux Vases 2,596 ft., Ste. Genevieve 2,651 ft., Fredonia 2,665 ft., McClosky 2,693-2,700 ft., McClosky dolomite 2,730-33 ft.

Cumberland County: Sohio 1 G. E. Morse, NE NE SW 28-10n-9e, dry at 2,680 ft., Tar Springs 1,995 ft., Glen Dean 2,117 ft., Barlow 2,218 ft., Cypress 2,298 ft., Paint Creek 2,365 ft., Benoist 2,403 ft., Renault 2,444 ft., Aux Vases 2,454 ft., Ste. Genevieve 2,500 ft., Rosiclare 2,522 ft., Fredonia 2,337 ft., no McClosky lime, St. Louis 2,666 ft.

Edwards County: Bander and Olds Drilling 1 Bradham, NE NE SE 3-1n-14w, dry at 2,963 ft., Menard 2,072 ft., Waltersburg 2,153 ft., Vienna 2,209 ft., Tar Springs 2,224 ft., Glen Dean 2,365 ft., Golconda 2,455 ft., Barlow 2,558 ft., Benoist 2,772 ft., Ste. Genevieve 2,870 ft., no McClosky lime.

Effingham County: Tide Water 1 George Danks, NE NW SW 29-6n-5e, dry at 2,602 ft., Menard 1,821 ft., Vienna 1,927 ft., Tar Springs 1,936 ft., upper Glen Dean 2,014 ft., Hardinsburg 2,077 ft., Barlow 2,167 ft., Paint Creek 2,265 ft., Benoist 2,325 ft., Renault 2,379 ft., Aux Vases 2,397 ft., Ste. Genevieve 2,464 ft., Rosiclare 2,478 ft., Fredonia 2,496 ft.

Fulton County: A. L. Smith 1 Bradley, SE SE SW 17-6n-1e (4th p.m.), dry at 1,130 ft., Keokuk 102 ft., Kendrick 345 ft., Devonian 589 ft., Silurian 620 ft., Maquokota 654 ft., Trenton 853 ft., St. Peter 1,116 ft.

Jefferson County: Roy Powers 1 Monroe, NE NE NW 36-4s-4e, dry at 3,441 ft., Tar Springs 2,572 ft., Glen Dean 2,639 and 2,665 ft., Hardinsburg 2,687 ft., Barlow 2,874 ft., Cypress 2,934 ft., Benoist 3,078 ft., Aux Vases 3,209 ft., Ste. Genevieve 3,248 ft., McClosky 3,327-31 ft., St. Louis 3,409 ft.

Magnolia 1 Newell-Badgett, SW NE NE 18-3s-3e, pumped 60 bbl. oil, 19 bbl. water. Aux Vases sand shot at 2,677-89 ft. T.D. 2,693 ft. Discovery well 2½ mi. S of Mount Vernon.

Richland County: Yingling et al 1 Richey, NE NE SE 10-2n-10e, dry at 3,368 ft., Glen Dean 2,696 ft., Hardinsburg 2,723 ft., Golconda 2,776 ft., Barlow 2,870 ft., Cypress 2,894 ft., Paint Creek 3,079 ft., Benoist 3,132 ft., lower Renault 3,196 ft., Aux Vases 3,218 ft., Ste. Genevieve 3,250 ft., McClosky 3,296-3,305 ft.

Shelby County: Siemaker & Buell 1 Workman, C NW SE 6-10n-4e, dry at 1,959 ft., Tar Springs 1,410 ft., Barlow 1,549 ft., Cypress 1,631 ft., Paint Creek 1,703 ft., Aux Vases 1,776 ft., Ste. Genevieve 1,836 ft., McClosky 1,873 ft.

Washington County: Texas 1 M. Eiffert, NE SE NW 31-4s-1w, dry at 1,597 ft., Benoist 1,259-1,300 ft., Rosiclare 1,468-84 ft.

Wayne County: Pure 1 Weaver Barnard, NE SE SE 7-1s-6e, dry at 3,235 ft., McClosky lime 3,195-3,235 ft.

MICHIGAN

Lowering of Reserves Is Spurring Drilling Effort

SAGINAW, Mich.—Ten completions in Michigan oil and gas fields last week resulted in six more oil producers, one gas well and three dry holes. Reflecting the interest of operators in efforts to find new reserves, the dry holes were wildcat tests, one in Gilson Township, Bay County, another in Fork Township, Mecosta County, the third in Midland. Meanwhile, the Fork Township field was enhanced by the two best producers of the week, Sun Oil Co. wells on the Murray lease in Section 5. The wildcat test was in Section 23.

The Michigan situation prompted F. R. Frye, state petroleum engineer, to observe that currently Michigan wells are producing only about 20 per cent of the state's oil requirements and that dwindling reserves are spurring search for new fields, a quest that has been virtually fruitless this year. He pointed out that while Michigan oil pools currently are producing about 57,300 bbl. a day and at an annual rate of about 21,000,000 bbl., only about half as many new producers have been completed this year as for a comparable period in 1942 and making the situation worse, the 1943 wells produced initially less than 15 per cent of those completed in 1942.

WILDCAT COMPLETIONS

Bay County, Gibson Township: Ervin Major 1 A. H. & P. M. Sivier, C SW NE 1-

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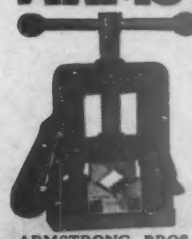

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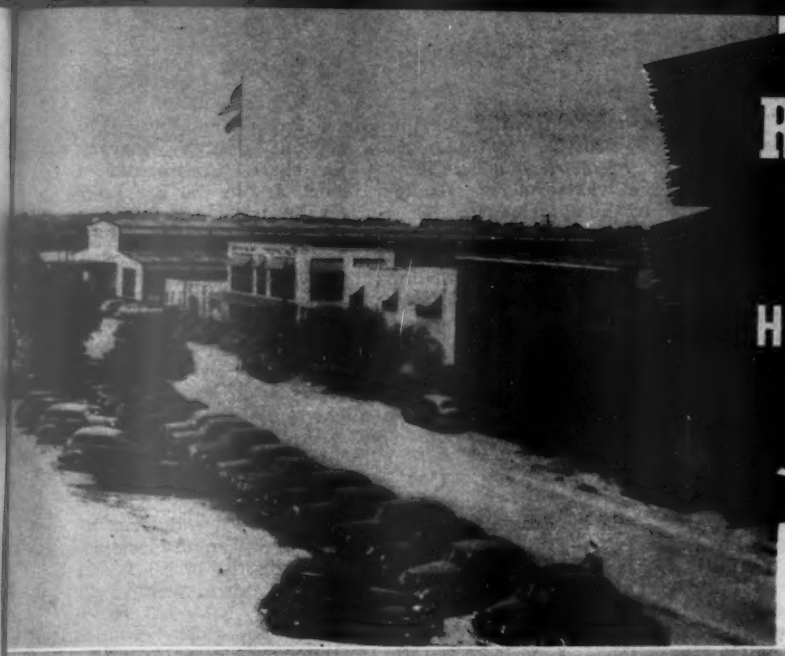

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18n-3e, show of oil and gas around 2,500 ft. in Monroe, completed dry, T.D. 2,973 ft.

Mecosta County, Fork Township: Rex Oil & Gas Co. 1 Sherman Kinney, SE NW SW 23-16n-7w, dry hole, T.D. 1,481 ft

Midland County, Geneva Township: Rex Oil & Gas Co. 1 W. W. Sprenger, et al, SE SE NE 3-15n-2w, dry in Monroe, T.D. 3,800 ft.

LOUISIANA GULF

Exploration Work Started In Rockefeller Preserve

NEW ORLEANS, La.—Whether oil fields are to dot the Rockefeller Game and Wildlife Preserve remains to be seen, but that such a possibility exists is evident in the light of the fact that four tracts of 5,000 acres each, out of the 81,000 acres that comprise the preserve, have been leased to two major oil companies by the State Mineral Board. Humble Oil & Refining Co. acquired three of the tracts through its bid of $107,000 cash for each of two, and $53,400 cash for the third. Magnolia Petroleum Co. outbid competitors for the fourth tract with an offer of $200,250 cash.

Preceding these transactions the board had invited bids for the right to make a geophysical exploration of the whole preserve. Humble got the shooting permit with its high bid of $89,000. Thus, within a few months the state has received $558,450 from this source. Any sort of oil development on the preserve was formerly prohibited by terms of the agreement with the Rockefeller Foundation, but these have been modified so as to allow such development so long as it does not cause serious disturbance of wild life. Oil observers express the view that each of the four tracts leased is regarded as a potential oil field by the lessees. Money which Louisiana obtains through its ownership of the preserve will be used in improving the preserve. Any not needed for that purpose will be devoted to state schools.

Evangeline Parish.—Six-inch casing is being run at Danciger Oil & Refining Co. 1 Hattie Haas, Reddell area deep test. Upon completion of that job production tests are to be made. Total depth is 12,206 ft. An electrical survey run to the bottom is reported to have indicated possibility of an oil sand at 12,115-25 ft., and there was a show of gas at 12,041-66 ft. Continental Oil Co. is building roads for another wildcat in the Reddell area, the 3 Pardee Co., 20-4s-1w.

Cameron Parish.—Pure Oil Co. 1 Snake Lake (State lease 549), a 9,500-ft. test in the East Grand Lake area, total depth 2,266 ft., recovered stuck drill stem, cemented 10¾-in. casing at 2,262 ft., and was waiting for cement to set. Magnolia 1 Moore, 3 miles east of the Black Bayou field, was shut down on account of high water at 4,165 ft. in shale. Continental 1 Adolph Hebert, Jr., in the Big Lake area, ran an electrical survey from 11,502 to 10,548 ft., with no show reported. As the week closed it was drilling at 11,504 ft. in shale.

Rapides Parish.—Moran Oil Co. 1 Meeker, in the North Lake Cocodrie area, a 7,500-ft. test, ran an electrical survey to 6,004 ft., with no shows reported. It was said to have encountered a slight oil show by core at 6,184-98 ft. At latest report it was drilling in broken sand and shale at 6,590 ft.

Acadia Parish.—Amerada Petroleum Corp. 1 Daigle, 1¼ miles northeast of Church Point, ran an electrical survey to total depth, 10,500 ft. in shale, and is shut down, waiting on orders.

Beauregard Parish.—Sohio Producing Co. 1 Lutcher-Moore, 1¾ miles west of Fields, a 12,000-ft. test, was coring at 10,761 ft. in shale. It began coring at the top of the Wilcox, at 10,697 ft. No shows were reported.

LOUISIANA GULF COAST WILDCAT COMPLETIONS

Acadia Parish: Continental 1 Acadia Parish School Board, 16-7s-12, 71 bbl. through 7/64-in. choke, T.P. 2,450 lb., gas-oil ratio 6,239, perf. 8,586-91 ft., T.D. 9,909 ft. in sidetracked hole, P.B. 8,595 ft. Extends Ritchie field 1 mi. northward.

Terrebonne Parish: Union Oil Co. of California 1 Calvert & Todd, 1 mi. N of Houma, dry at 12,009 ft.

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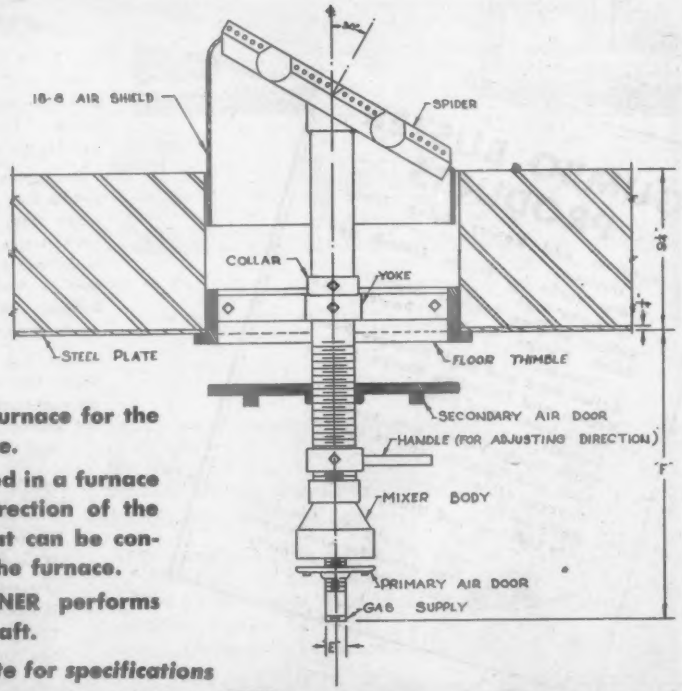

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ROCKY MOUNTAIN

Montana Production and Drilling Are Down

DENVER, Colo. — Montana lacked 619,366 bbl. of filling its allocations for crude-oil production in the first 6 months of 1943, according to the semiannual report of the Montana Oil Conservation Commission. Total production from all fields for the period was 3,732,934 bbl., which compares with 3,959,065 bbl. in the first half of 1942, a decrease of 226,131 bbl. Allocations by the Petroleum Administrator for War were 24,700 bbl. daily in January and February, 23,400 bbl. in March, 24,600 bbl. in April and May, and 22,300 bbl. in June. These aggregate a total of 4,352,300 bbl. allocated for the 6 months against which the state produced 3,732,934, or 619,366 bbl. less than it needed to meet its requirements.

The failure of the Montana fields to yield the quantities of oil allocated to the state are credited to a number of causes. Among these were the delays in reaching agreements concerning spacing patterns in the two principal fields, the shortage of drilling crews and drilling equipment, difficulties in obtaining casing and other oil-field materials, and the adjustment of operations of wartime requirements. The producers, the federal authorities and state officials met the critical situation in a most cooperative spirit and during the 6 months most of the difficulties were ironed out. The spacing patterns were changed through the filing of exceptions to permit the drilling of more wells in the Cut Bank and Kevin-Sunburst fields, arrangements were completed for the establishment of stock pools at Cut Bank and Casper, and additional crews and rigs were brought in from other districts. The results of the improved situation are expected to show up in the figures for the last half of the year, and much of the lost ground will be recovered. Montana was called upon for all the oil it could produce to supply the Pacific Northwest and Canadian markets, and as a result of the increased demand the state is experiencing one of its most far-reaching exploration campaigns for the development of new production.

Little Buffalo Basin tests start.— The Little Buffalo Basin structure in the Big Horn basin in northern Wyoming, which holds out very definite promises of proving to be another Elk Basin field in deeper horizons, will have two tests to the Tensleep this summer. Locations were released this week for Fred Goodstein 1 State-Grebo Royalties, NE NE SE 2-47n-100w, and Goodstein's 1 Pedley, NE NE NW 13-47n-100w. Contracts for both have been let to Manning & Brown, Inc., and rotaries are being moved in. The field has been producing gas from the Frontier sands at 1,700 ft. since 1914, the same year in which Elk Basin came in as an oil field in the same formation. The Tensleep has never been tested at Little Buffalo Basin, and Elk Basin had its Tensleep discovery only last December. Drilling at Elk Basin already has shown that the deeper pay covers four or five times as much area as the shallow sands, and similar results are expected in the new operation. Both tests are on the west side of the east dome and approximately 400 ft. down from the top of the structure where it is believed they will miss the gas cap in the deep sand, and both are within the gas contours of the upper sands. One of the tests is on a state lease and the other on a federal lease. Neither so far is in the unit agreement for the field which is being organized by the Ohio Oil Co. and the Stanolind Oil & Gas Co., and which is drawn to take in 17,660 acres within the possibly productive area.

Sunburst sand pool in Cut Bank extended. — Glacier Production Co. 3 McGuinnes unit, SE NW SW 5-35n-5w, extended the Sunburst sand pool

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developed last fall in the northern part of the Cut Bank field ½ mile to the north. This makes three wells producing from the Sunburst sand in that pool. The wells are west of the Cut Bank gas field and east and northeast of the oil field. The nearest gas well, producing from the Cut Bank sand, is a mile to the southeast. The three Sunburst sand wells prove up about 320 acres. No. 1 had 32 ft. of saturated sand, having stopped while still in sand. The second well had 30 ft. of saturated sand, and the third having 45 ft., but with the main pay consisting of only 8 ft.

EASTERN TEXAS

Quitman Pool Extension Flowing Oil By Heads

DALLAS, Tex.—Extension of the Quitman pool was definitely assured this week when Rogers Lacy 1 M. H. Cox, 467 ft. from north and east lines of a 40-acre tract in James Barfield Survey, ¾ mile southwest of Shell 1 Kirkland, nearest producer, began flowing by heads after 5½-in. casing set at 5,342 ft. was perforated with 120 shots from 6,260 to 6,300 ft. This is the second time Lacy has extended the pool, his first attempt being his 1 Stone and Jackson unit in the Hazard Anderson Survey, which spread the field northeast, and it is still the most northeasterly well in the field. The recent extension adds about 500 proven acres to the field, which is now 2½ miles long in a northeast-southwest trend, and ¾ mile at the widest part.

Henderson County.—The Tri-Cities gas-condensate field was extended 4,500 ft. southeast by Stanolind Oil & Gas Co. 1-D Tri-Cities Unit, Wiley Key Survey, when it flowed 203.58 bbl. of distillate in 24 hours on official potential test, with gas-oil ratio of 11,798 to 1, after acid treatment of 2,000 gal. at plugged back total depth of 7,616 ft.

Smith County.—Abandonment was ordered for Patrick & Tyrrell 1 O. Hackett, Samuel Leeper Survey, 1½ miles north of Sand Flat, at total depth 9,852 ft., without plugging back to test the showing in the Paluxy zone from 7,281 to 7.307 ft.

Skelly Oil Co. announced a new 10,000-ft. wildcat to be known as 1 Chisum et al, 550 ft. north, 1,400 ft. west of the northwest corner of Thos. Hawkins Survey, Abstract 419, in Block 13, Daniel Minor Survey, 2 miles southeast of Sand Flat.

Hunt County.—Drilling was resumed on Humble Oil & Refining Co. 1 Graham, a deep tert on the west side of the Weiland pool, which topped the Smackover at 9,012 ft. At last reports it had progressed to 9,500 ft.

Kaufman County.—Sun Oil Co. 1 J. M. Rutledge, a deep test in the Parsons Survey, had drilled to 9,458 ft. expecting top of the Smackover within the next 200 ft.

Trinity County.—American Liberty Oil Co. 1 T. H. Morrison, 1,125 ft. from east, 660 ft. from south, W. M. Watson Survey, 6 miles west of Apple Springs, is location for a new 6,000-ft. test.

EAST TEXAS WILDCAT COMPLETIONS

Franklin County: L. A. Greeling, Jr. 1 Stanley, W. B. Jordan Sur., O.W.D.D. O.T.D. 6,155 ft., D.D. to 8,442 ft., dry.

Limestone County: H. H. Wegner 1 W. E. Sims, 330 ft. from NE, 2,310 ft. from NW Sec. 24, J. L. Chavert Sur., 10¼ mi. SE of Groesbeck, elev. 370 ft., Midway 1,255 ft., Navarro 1,325-35 ft., Nacatoch 1,615-25 ft., Taylor 1,850-60 ft., dry, T.D. 3,200 ft.

Smith County: Patrick & Tyrell 1 Oliver Hackett 880 ft. from S, midway between E & W lines 51-ac. tract, Sam'l. Leeper Sur., 1½ mi. NE of Sand Flat, elev. 469 ft., Pecan Gap 3,214-3,439 ft., Austin 4,562 ft., Eagleford 4,077 ft., Woodbine 4,922 ft., Georgetown 5,725 ft., Paluxy sand 7,380 ft., massive anhydrite 9,305-9,481 ft., porosity 9,676-9,701 ft., dry, T.D. 9,852 ft.

Wood County: Superior Oil Co. 1 Carlisle & Farris, 3,450 ft. from E, 1,911 ft. from S, Gabriel Blackburn Sur., 44½ mi. SE Mineola, elev. 339 ft., Woodbine 7,540 ft., dry, T.D. 7,695 ft., shale.

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CONDENSED STATEMENT OF CONDITION

JUNE 30, 1943

RESOURCES

Loans and Discounts		$ 39,110,211.46
Bankers' Acceptances and Commodity Loans		8,872,337.41
Banking House		1,903,000.00
Other Real Estate		106,266.27
Furniture and Fixtures		276,546.49
Stock in Federal Reserve Bank		300,000.00
U. S. Government Securities		66,907,421.91
State, Municipal and Other Securities		2,110,225.31
Cash in Vault and with Banks		49,832,492.80
Total		$169,418,501.65

LIABILITIES

Capital	$ 5,000,000.00	
Surplus	5,000,000.00	
Undivided Profits	901,599.18	$ 10,901,599.18
Reserve for Dividends, Payable July 1, 1943		100,000.00
Reserve for Taxes, Etc.		830,362.38
DEPOSITS:		
Individual	$91,082,395.34	
Banks	53,820,399.27	
U. S. Government	12,683,745.48	157,586,540.09
Total		$169,418,501.65

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SOUTHWEST TEXAS

Willamar Pool Extension Makes Flow of Oil

CORPUS CHRISTI, Tex.—A 2-mile southeastern extension of the Willamar field was in prospect this week. Following an electrical survey at Baldridge & King 1 J. C. Cavazos, in the San Juan de Carricitos grant, Willacy County, 5½-in. casing was cemented at 7,928 ft. The well was drilled and washed to bottom at 7,959 ft., and 2-in. tubing was run. At latest report the well was flowing at the rate of 192 bbl. of fluid daily, 90 per cent oil and 10 per cent wash water, through ⅛-in. choke. Tubing pressure was 200 lb., shut-in casing pressure 500 lb. Production was coming from the Kent sand, on top of which the oil string had been landed. Testing was being continued.

The Cavazos, which had shown for a good producer on a 24-minute drill-stem test, touched off a flurry of lease and royalty buying in Willacy County and the northern part of Cameron County. Royalty base went to $300 on reports of the test. Leases have been acquired on practically all open tracts in the area, and drilling blocks were being organized this week north and south of the test. As soon as this well has been brought into production the rig is to be moved to 1 Yturria Land & Livestock Co., 5 miles northeast of Yturria, where Baldridge & King, who are drilling contractors as well as producers, will drill a wildcat for Texas Co., Pan American Production Co. and Standard Oil Co. of Texas are supporting the 1 Cavazos.

No shows had been reported at Sinclair Prairie Oil Co. 1 C. E. Wertz, a Willacy County wildcat a mile east of Raymondville, drilling at 6,923 ft. in shale. Carl I. Olsen has location staked for a wildcat test, 1 Lincoln, 8½ miles southeast of the Willamar field, in Willacy County.

Nueces County.—Texas Gulf Producing Co. staked location of 1 W. E. Baxter, 5 miles northwest of Robstown. J. E. Thomas set 10¾-in. casing at 1,017 ft. and was drilling at 3,600 ft. in shale at 1 Jalufka, 3 miles southeast of Clarkwood.

Victoria County.—Edwin Neilson et al were moving in at 1 J. W. Ragsdale, 5½ miles southeast of Inez. New location spotted was H. R. Cullen et al 1 Orbin Beall, 2½ miles north of Decosta. Bridwell Oil Co. 1 J. F. Whitney, 9½ miles south of Victoria, had derrick up.

Duval County.—Hiawatha Oil & Gas Co got no pressure on a 1-hour drill-stem test at 24 Southland Life Insurance Co., with perforations at 5,177-82 ft. and ¼-in. chokes at top and bottom. It recovered 1,380 ft. of salt water with a trace of gas. Operator ran 2-in. tubing and was swabbing salt water. Total depth is 5,335 ft., plugged back to 5,240 ft. Stanolind has staked location for 2 Driscoll, 2 miles northeast of the Strake field.

Starr County.—Continental Oil Co. was preparing to make a drill-stem test at 1 Cameron, 2 miles northeast of the Rincon field. This well was at 4,050 ft. in hard sand and had encountered slight gas odor. T. E. Stephens was rigging up for 1 A. Ramos, 2 miles east of Buena Vista. Sun Oil Co. was drilling at 6,464 ft. in shale at 1 P. L. Salinas (second hole), 2 miles southeast of the North Sun field.

LOWER GULF COAST WILDCAT COMPLETIONS

Nueces County: Texas Gulf Producing Co. 1 S. A. Simcik, 5 mi. SW of Corpus Christi, dry at 7,518 ft.

SOUTH TEXAS WILDCAT COMPLETIONS

Starr County: Judge Brothers et al 2-B Z Salinas, 4 mi. SW of San Roman, dry at 1,602 ft.

John T. O'Neill et al 1 H. Phillips, 6 mi. NW of North Rincon field, dry at 5,548 ft.

SOUTH CENTRAL TEXAS WILDCAT COMPLETIONS

Gonzales County: Baldridge & King et al 1 Eugene Bowers, 3½ mi. SE of Waelder, dry at 5,510 ft.

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N. CENTRAL TEXAS

Wildcats Active With Four New Pools Brought In

WICHITA FALLS, Tex.—Four new oil fields were discovered in North Texas last week, two in Young County, one in Archer County, and a small pumper in Wilbarger County.

In Young County, Deep Rock Oil Co. 1 R. L. Morrison, 330 ft. from south and east lines of north half F. McLaurin Survey, 2 miles east of Bunger, was flowing natural at the rate of 33 bbl. per hour from Mississippi lime pay from 4,439 to 4,457 ft. The well topped Caddo lime at 3,624 ft., with 8,000,000 cu. ft. gas showing on drill-stem test from 3,977-95 ft., topped Marble Falls lime at 4,060 ft., and Barnett shale at 4,375 ft.

Southwest Young County.—Anderson-Prichard Oil Corp. and Col-Tex Refining Co. 1 W. T. Donnell, 990 ft. from most northern line, 4,101 ft. from west line of 1,046-acre tract in Margaret Edmonds Survey, 2 miles southeast of Murray, was completed flowing 212 bbl. daily on ¼-in. tubing choke, from Marble Falls pay perforated with 45 shots from 4,182-95 ft. The well had been drilled to total depth 4,768 ft., topping Mississippi lime at 4,512 ft., with show of oil at 4,577-80 ft., but a treatment of 5,000 gal. acid, through perforations 4,573-84 ft. tested salt water and only a small amount of oil and the hole was plugged back to 4,200 ft. After treatment of 1,000 gal. of acid through perforations opposite Marble Falls pay, the well flowed 45 bbl. in 10 minutes and then flowed 4½ bbl. per hour for 12 hours.

Southwest Archer County.—L. T. Burns 14 Ickert, Block 17, Crawford Pasture subdivision, was completed from Caddo lime pay for 159.25 bbl. oil in 8 hours through ½-in. tubing choke, casing pressure 500-70 lb., tubing pressure 500-130 lb. Top of the Caddo was logged at 4,453 ft., Mississippi lime at 5,011 ft., and hole is bottomed at 5,165 ft. in lime. Efforts to develop production from Mississippi lime failed, and hole was plugged back to 4,595 ft. Casing was perforated with 20 shots from 4,582-90 ft., and the pay was acidized. Gravity of the oil is 41.5°.

Wilbarger County.—Humble Oil & Refining 1 Mary Schmoker, SW NW Sec. 114, Blk. 14, H.&T.C. Survey, 5 miles southwest of Vernon, drilled to 6,440 ft. in lime, plugged back to 4,860 ft., treated pay from 4,831-57 ft. with 5,000 gal. acid and looked like a 50-bbl. pumper.

Rapid development is seen for the "Midway" pool of Clay County, recently opened by L. T. Burns 1 Thompson, between the Joy-Mississippi and the Buffalo Springs pools. All of the surrounding acreage is owned by Burns et al, and east and northeast offset locations have been made. Another wildcat venture for Burns is his 1 Jewell Gilbert 1,650 ft. from north line, 1,907 ft. from west line of lease in C. F. Bridgeman Survey, 21 miles west of Joy, which will go to 6,500 ft. with rotary rig.

Tarrant County.—Second active operation for the south end of the Fort Worth basin, was announced last week. It is to be a 7,300-ft. test near Keller, seeking Ellenburger production. Martin, Moore, and Brewster 1 R. B. England is the test, 440 ft. from south and west lines of an 86-acre tract in the R. Baker Survey, 4 miles northwest of C. Andrade III 1 Sharpless, which has erected derrick for 8,000-ft. test.

NORTH CENTRAL TEXAS WILDCAT COMPLETIONS

Archer County: Henry Grace Prod. 1 F. J. Henry, 400 ft. from N, 1,450 ft. from E, Sec. 35, Blk. 5, Clark & Plumb Subd., pumped 38 bbl., sand pay 897 ft., T.D. 906 ft. Discovery.

Louis Sikes 1 Virgil Seay, 300 ft. from N and E, Blk. 63, Harris Club Subd., 6 mi. W Archer City, dry, T.D. 1,415 ft. shale, Gunsight 1,368-71 ft.

C. W. & W. L. Snoddy 1 J. J. Perkins et al, Sec. 9, Blk. 3, H.&T.C. Sur., dry, T.D. 1,758 ft.

Clay County: W. H. Metzner 2 J. P. Boddy, 950 ft. from NE, 400 ft. from NW, 518-ac. lse., W. Richardson Sur., dry, T.D. 1,395 ft.

J. L. Webb 1 C. T. Taylor est., 150 ft. from NE, 200 ft. from SE, Blk. 72, Bacon Subd., dry, T.D. 1,360 ft.

Cooke County: Benson Bros. 1 J. H. Cooke, A. Peterson Sur., pump 12 bbl., sand pay 1,133 ft., T.D. 1,159 ft. Discovery.

Texas Co. 1 M. L. Townsley, 300 ft. from N & E, 138-ac. tract, Wm. Slingland Sur., dry, T.D. 2,033 ft.

Jack County: W. H. Carter 1 J. T. Roney, Sec. 3324, T.E.&L. Sur., dry, T.D. 865 ft.

Standard Oil Co. of Texas and Hanlon-Buchanan 1 Ellen Smith, 660 ft. from S & E, 138-ac. lease, O. H. P. Davis Sur., 4 mi. SE Antelope, S.S.O. 3,004-11 ft., Caddo lime 4,945 ft., dry, T.D 5,203 ft., shale and lime.

Wichita County: W. V. Coffey 1 T. B. Michie, 990 ft. from S, 750 ft. from W 120-ac. lease, B. N. Ferguson Sur., dry. T.D. 1,812 ft.

Consolidated Oil 1 A. Laukhuff, Lot 5 Cherokee County School Land, 2 mi. S Wichita Falls, flow 750 bbl., Strawn sand pay perf. 168 shots 4,415-65 ft., acid 1,000 gal., P.B. to 4,474 ft. from T.D. 5,401 ft. Discovery.

Continental Oil 1 G. T. West, 4,922 ft. from N, 330 ft. from E, G. W. Scott Sur., 1½ mi. W Wichita Falls, pump 154 bbl., KMA pay 4,262 ft., Caddo lime 5,214 ft., S.O. 5,267-71 ft., Mississippi lime 5,302 ft., no shows, Ellenburger 5,520 ft., P.B. to 4,260 ft. from T.D. 5,687 ft., dolomite. Discovery.

F. H. Gohlke 1 Mrs. M. E. Carey est., Blk. 10, Pratt's Subd., dry, T.D. 1,265 ft.

Paul B. Scott 1 J. L. & T. J. Waggoner, Sec. 21, Blk. 7, H.&T.C. Ry. Sur., dry. T.D. 1,856 ft.

Montague County: Stanolind Oil & Gas 1 C. A. Reed, 600 ft. from S & W, Sec. 48, Belcher subd., Guadalupe College Sur., S.S.O. 3,935-40 ft., L.S.O. 5,393-5,400 ft., Cong. S.O. 5,511-14 ft., Simpson lime 5,720 ft., Simpson dolomite 5,741-65 ft., S.O.; Ellenburger 5,910 ft., dry, T.D. 6,007 ft.

Wilbarger County: W. T. Waggoner est. 1-OO Waggoner, 1,320 ft. from N, 330

ft. from W. Sec. 38, Blk. 4, H.&T.C. Ry. Sur., dry, T.D. 1,993 ft.

WEST CENTRAL TEXAS

ABILENE, Tex.—Three new wildcat locations were announced for Jones County last week.

Near Hawley, Harold G. Neely et al 1 Ethel Calvert is 330 ft. from south and west lines of 71-acre tract in G. Martinez Survey 195, and will be a Swastika sand test, projected to 2,600 ft.

South of the South Noodle pool, Alston & Pace 1 Penrod et al is 467 ft. from north and west lines of SW Section 28, Block 18, Texas & Pacific Survey, 6 miles northwest of Merkel, and is scheduled to go to 3,050 ft. or Swastika sand.

Watchorn Oil & Gas Co. 1 E. E. Farnsworth, 2,000 ft. from north, 400 ft. from west of Lot 4, Samuel Jones Survey 266, is a 3,000-ft. wildcat test about 10 miles southwest of Anson.

Stephens County.—Near an area in which three gas wells and one small producing oil well, now abandoned, have been drilled, Frank Buttram has staked 1 R. A. Ritchie, 467 ft. from north and east lines of NW Section 1293, T.E.&L. Survey, 6 miles northwest of Breckenridge, to go 3,500 ft.

Carey & Carey 1 Cretsinger, outpost to the Whelan pool, northeast part of Stephens County, registered a flow of 11,000,000 cu. ft. gas from Marble Falls pay from 3,974 to 4,150 ft.

Auto-Ordnance Co. has staked a wildcat location, 2 miles east of Caddo pool production, is NE SW Section 1098, T.E.&L. Survey.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Brown County: Cherry & Kidd 1 Ira W Hudler, 330 ft. from S & E, 68-ac. lease Sec. 18, Blk. 3, B.B.B.&C. Ry. Sur dry, T.D. 1,025 ft.

Coleman County: Anzac Oil 50-J J. P. Morris, NE NW NE Sec. 721, W. B. Twitty Sur., dry, T.D. 3,553 ft.

Shackelford County: Fain & McGaha 1 J. A. Matthews ranch, 1,020 ft. from S 1,200 ft. from W, Sec. 1, E.T.R.R. Sur. dry, T.D. 985 ft.

Stephens County: Carey & Carey 1 Mrs Emma Cretsinger, 1,900 ft. N, 467 ft W of NE C, Sec. 1092, but in Sec. Blk. 1, S.P.R.R. Sur., flow 11,000,000 cu. ft. gas, Caddo 3,540 ft., S.O. 3,540-52 ft. Marble Falls lime S.O. 3974-82 ft., perf. 3 shots 4,075-78 ft., T.D. 4,150 ft. lime and shale. Extension Whelan pool.

Taylor County: Fain & McGaha 1 Homer Patterson, Lot 22, Lge. 148, Grimes County School Land, elev. 1,848 ft., dry T.D. 2,755 ft.

Appalachian

(Continued from Page 92)

Department found the Newburg at 5,235-42 ft. in 655 Bull Creek Coal Land Co. with a showing of 140,000 cu. ft. gas in that horizon. The Oriskany at 4,571-83 ft. was very light. On the Coal River Mining Co. lease, this operator's No. 656 placed the Newburg at 4,822-33 ft. and it was dry. Here, the Oriskany was at 4,248-53 ft.

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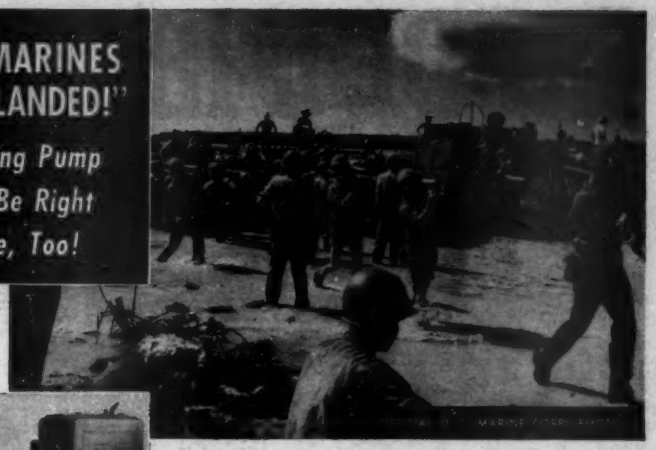

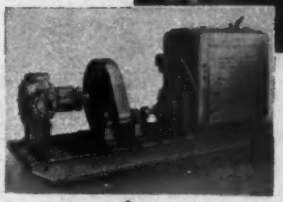

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	1	2	3	4	5	6	7
Below 21	...	...	...	...	$.85	$.75	...
21-21.9	..	..	..	..	.87	.78	..
22-22.9	..	..	..	..	.89	.81	..
23-23.9	..	..	..	..	.91	.84	..
24-24.9	..	..	..	..	.93	.87	...
Below 25	$.92	...	...	$.86			...
25-25.9	.95	$.95	...	.88	.95	.90	...
26-26.9	.97	.97	...	.90	.97	.93	..
27-27.9	.99	.99	...	.92	.99	.96	..
28-28.9	1.01	1.01	$1.01	.94	1.01	.99	..
29-29.9	1.03	1.03	1.03	.96	1.03	1.02	..
30-30.9	1.05	1.05	1.05	.98	1.05	1.05	$1.05
31-31.9	1.07	1.07	1.07	1.00	1.07	1.07	1.07
32-32.9	1.09	1.09	1.09	1.02	1.09	1.09	1.09
33-33.9	1.11	1.11	1.11	1.04	1.11	1.11	1.11
34-34.9	1.13	1.13	1.13	1.06	1.13	1.13	1.13
35-35.9	1.15	1.15	1.15	1.08	1.15	1.15	1.15
36-36.9	1.17	1.17	1.17	1.10	1.17	1.17	1.17
37-37.9	1.19	1.19	1.19	1.12	1.19	1.19	1.19
38-38.9	1.21	1.21	1.21	1.14	1.21	1.21	1.21
39-39.9	1.23	1.23	1.23	1.16	1.23	1.23	1.23
40 and above	1.25	1.25	1.25	1.18	1.25	1.25	1.25

OKLAHOMA AND KANSAS TABLE EXPLANATION

Column 1 Mid-Continent grades:
Pure Oil Co., 5-20-41.
Gulf Oil Corp., 5-20-41.
Skelly Oil Co. (Kansas only), 5-19-41.
H. F. Wilcox Oil & Gas Co., 5-20-41.

Column 2 Mid-Continent grades:
White Eagle Oil Purchasing Co., Inc., 5-19-41, Kansas only.
Sinclair Prairie Oil Marketing Co., 5-20-41.

Column 3 Mid-Continent grades:
Continental Oil Co., 5-19-41.
Phillips Petroleum Co., 5-19-41.
Tide Water Associated Oil Co., 5-20-41.

Column 4 Jackson and Tillman counties:
Gulf Oil Corp., 5-20-41.

Column 5 Mid-Continent grades:
Standard Oil Co. (Indiana), 5-20-41.
National Refining Co., 5-20-41.

Column 6 Mid-Continent grades:
Magnolia Petroleum Co., 5-21-41.
Shell Oil Co., Inc., 5-19-41.
Shell, in Carter County, 12-5-41.
Ben Franklin Refining Co., 12-4-41.
Carter Oil Co. (Oklahoma only), 5-19-41

Column 7 Oklahoma:
Champlin Refining Co., 5-20-41.

OKLAHOMA FLAT PRICE

Cumberland	$1.14

Pure Oil Co., 9-4-41.

LOUISIANA AND SOUTHERN ARKANSAS TABLE EXPLANATION

Standard Oil Co. of Louisiana, 5-22-41.

Column 1 applies to Atlanta, Buckner, Magnolia, Schuler (Jones sand), Village, and Lewisville fields.

Column 2 applies to De Soto, Sabine, Fouke, Homer, Miller County, Sugar Creek, and Nebo.

Column 3 applies to Little Creek, Olla, and South Olla (4-3-43).

Column 4 applies to Bayou Mallet, Choctaw, Darrow, Jeanerette, Lirette, North Crowley, South Crowley, Port Barre, Potash, Roanoke, St. Martinville, and Port Allen.

Column 5 applies to University (Baton Rouge). Posted 6-2-42.

Column 6 applies to Cotton Valley crude, Rodessa and Shreveport (Cross Lake); also Anse La Butte, effective 8-1-41, starting at 80 cents for below 21°, also to Caddo effective 10-15-41.

Continental Oil Co., 5-21-41.

Column 7 applies to Abbeville, Louisiana.

Stanolind Oil & Gas Co., 5-21-41.

Column 8 applies to East and West Hackberry.

Column 9 applies to Caddo Parish, effective 10-15-41.

Column 9 applies to Evangeline, Acadia Parish.

Lion Oil Refining Co., 5-22.41.

Column 1 applies to Reynolds lime, Jones sand, Schuler, Ark.

Column 2 applies to El Dorado, West and South Rainbow fields, Snow Hill, and Schuler-Morgan sand.

Placid Oil Co., 5-22-41.

Column 3 applies to Olla.

Column 2 applies to Nebo field.

Shell Oil Co., Inc., 5-20-41.

Column 10 applies to Roanoke, Chalkley.

Column 11 applies to Iowa, Black Bayou, White Castle.

Column 12 applies to Gibson, South Houma, Hester, West Lake Verret.

Magnolia Petroleum Co., 5-21-41.

Column 13 applies to Lockport, Cameron Meadows, and West Gueydan, La.

Column 8 applies to Haynesville, Cotton Valley, Rodessa, La., and Miller County, Arkansas.

Phillips Petroleum Co., 3-29-41.

Arkansas Fuel Oil Co., 2-19-42.

Column 1, Schuler (Jones sand), except schedule starts at 76 cents for below 28° gravity.

Gulf Refining Co., 5-21-41.

Column 5, Jennings.

Column 6, Edgerly, Starks, Vinton, East Hackberry, Cameron Meadows, and Leesville.

Column 18 applies to Grand Bay, Quarantine Bay, Timbalier Bay, and West Bay, except schedule starts at $1.13 for below 28° gravity.

Column 6 applies to Caddo, Homer, Bull Bayou, Crichton, De Soto, Haynesville, and El Dorado.

Column 4 applies to West Gueydan, effective 5-25-42.

Pure Oil Co., 4-22-41.

Column 14 applies to Gueydan crude.

Column 6, Caddo, Homer, Haynesville, Bull Bayou, Crichton, De Soto, and El Dorado.

Texas Co., 5-21-41.

Column 6 applies to North Louisiana.

Columns 15 and 16, Bay St. Elaine, Caillou Island, Iberia, Lake Barre, Lake Pelto, Leesville, Port Barre. (Schedules A and B).

Column 17, Bateman Lake, Dog Lake, Fausse Point, Horseshoe Bayou, Jefferson Island, Plumb Bob, Vermilion Bay, West Cote Blanche, and Delta Duck Club.

Column 18, Delta Farm, Lake Salvador, Golden Meadow.

LOUISIANA AND ARKANSAS FLAT PRICES

Continental Oil Co.:	
Tepetate and Lake Arthur, 5-21-41	$1.18
Ville Platte, 5-22-43	1.30
Bear, 5-15-43	1.30
Gulf Refining Co., 5-21-41:	
Smackover (Ark.)	$0.83
Lion Oil Refining Co., 5-22-41:	
Smackover (heavy)	.83
Dorcheat	1.18
Phillips Petroleum Co., 5-22-41:	
Smackover (heavy)	$0.83
Placid Oil Co., 5-22-41:	
Tullos-Urania (5-21-41)	$1.15
Cotton Valley dist. (above 60°)	1.30
Cotton Valley (Holloway sand)	1.28
Cotton Valley (Bodcaw-D sands)	1.30
Pure Oil Co.:	
Bosco (5-21-41)	$1.14
Sweet Lake (5-22-41)	1.06
Creole (5-22-41)	1.16
Republic Oil Co., 6-3-41:	
Nevada County, Arkansas	$0.80
Republic Oil Refining Co., 5-21-41:	
Bayou Pigeon	$1.30
Shell Oil Co., Inc., 5-20-41:	
Happytown	$1.15
Standard Oil Co. of Louisiana, 5-22-41:	
Big Creek, Dorcheat, McKamie, Columbia, Macedonia (sour) (2-3-43)	$1.28
Smackover (heavy)	.83
Cotton Valley distillate (9-1-41)	1.40
Cotton Valley (Holloway sand)	1.28

LOUISIANA AND SOUTHERN ARKANSAS GRAVITY TABLE

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Below 18	...	...	...	...	...	...	...	...	...	...	...	...	$.94			...	...	...
18-18.9	...	...	...	...	...	...	...	...	...	...	...	...	.96			...	...	...
19-19.9	...	...	...	...	...	...	...	...	...	...	...	...	.98			...	...	...
Below 20	...	...	...	...	...	...	...	$1.06	...	$.94	$.90	$.80	...	...	$1.06	...	...	...
20-20.9	...	...	...	...	...	...	...	1.08	...	.96	1.01	.91	1.00	...	1.08	...	...	...
Below 21	$.88	...	...	$.90	...	...	...	...	...	...	...	...	...	$.90	...	...	...	...
21-21.9	.70	...	...	.92	...	...	...	1.10	...	.98	1.03	.93	1.02	.92	1.10	...	...	...
22-22.9	.72	...	...	.94	...	...	...	1.12	...	1.00	1.05	.95	1.05	.94	1.12	...	...	...
23-23.9	.74	...	...	.97	...	...	...	1.14	...	1.02	1.07	.97	1.08	.96	1.14	...	...	...
24-24.9	.76	...	...	.98	...	...	...	1.16	...	1.04	1.09	.99	1.11	.98	1.16	...	...	...
Below 25	...	$.86	$1.02	...	...	$.88	...	...	...	...	...	...	...	...	...	...	...	...
25-25.9	.78	.88	1.05	1.00	...	.90	...	1.18	...	1.06	1.11	1.01	1.14	1.00	1.18	...	...	...
26-26.9	.80	.90	1.07	1.02	...	.92	...	1.20	...	1.08	1.13	1.03	1.17	1.02	1.20	...	...	...
27-27.9	.82	.92	1.09	1.04	...	.94	...	1.22	...	1.10	1.15	1.05	1.19	1.04	1.22	...	...	...
28-28.9	.84	.94	1.11	1.06	...	.96	...	1.24	...	1.12	1.17	1.07	1.21	1.06	...	$1.14	$1.06	...
29-29.9	.86	.96	1.13	1.08	...	.98	...	1.26	...	1.14	1.19	1.09	1.23	1.08	...	1.16	1.08	...
30-30.9	.88	.98	1.15	1.10	$1.28	1.00	...	1.28	...	1.16	1.21	1.11	1.25	1.10	...	1.18	1.10	$1.05
31-31.9	.90	1.00	1.17	1.12	1.30	1.02	...	1.30	$1.07	1.18	1.23	1.13	1.27	1.12	...	1.20	1.12	1.07
32-32.9	.92	1.02	1.19	1.14	1.32	1.04	...	1.32	1.09	1.20	1.25	1.15	1.29	1.14	...	1.22	1.14	1.09
33-33.9	.94	1.04	1.21	1.16	1.34	1.06	...	1.34	1.11	1.22	1.27	1.17	1.31	1.16	...	1.24	1.16	1.11
34-34.9	.96	1.06	1.23	1.18	1.36	1.08	...	1.36	1.13	1.24	1.29	1.19	1.33	1.18	...	1.26	1.18	1.13
35-35.9	.98	1.08	1.25	1.20	1.38	1.10	...	...	1.15	...	...	...	...	1.20	...	1.28	1.20	1.15
Below 36	...	...	...	...	...	...	$1.07	...	...	...	...	...	...	...	...	...	...	...
36-36.9	1.00	1.10	1.27	1.22	1.40	1.12	1.09	...	1.17	...	...	...	...	1.22	...	1.30	1.22	1.17
37-37.9	1.02	1.12	1.29	1.24	1.42	1.14	1.11	...	1.19	...	...	...	...	...	...	...	...	1.19
38-38.9	1.04	1.14	1.31	1.26	1.44	1.16	1.13	...	1.21	...	...	...	...	...	...	...	...	1.21
39-39.9	1.06	1.16	1.33	1.28	1.46	1.18	1.15	...	1.23	...	...	...	...	...	...	...	...	1.23
40 and above	1.08	1.18	1.35	1.30	1.48	1.20	1.17	...	1.25	...	...	...	...	...	...	...	...	1.25

Lisbon distillate	$1.20
Texas Co., 5-21-41:	
Erath	$1.21
Garden Island	1.36
Lafitte, Paradis	1.19
Lake Mongoulois	1.36

CANADIAN FIELDS

Imperial Oil, Ltd.:	
Petrolia, 11-6-39	$2.10
Oil Springs, 11-6-39	2.07
Bothwell, 11-6-39	2.10
Turner Valley, 7-16-41	$1.35-1.97

SOUTH TEXAS AND SOUTHWEST TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7
Below 20	$1.03	$1.08	$1.08	$.89	$1.03	$1.03	$1.06
20-20.9	1.05	1.10	1.10	.90	1.05	1.05	1.10
21-21.9	1.07	1.12	1.12	.91	1.07	1.07	1.12
22-22.9	1.09	1.14	1.14	.92	1.09	1.09	1.14
23-23.9	1.11	1.16	1.16	.93	1.11	1.11	1.16
24-24.9	1.13	1.18	1.18	.94	1.13	1.13	1.18
25-25.9	1.15	1.20	1.20	.95	1.15	1.15	1.20
26-26.9	1.17	1.22	1.22	.96	1.17	1.17	1.22
27-27.9	1.19	1.24	1.24	.97		1.19	1.24
28-28.9	1.21	1.26	1.26	.98		1.21	1.26
29-29.9	1.23	1.28		.99			1.28
30-30.9	1.25	1.30		1.00			1.30
31-31.9	1.27	1.32		1.01			1.32
32-32.9	1.29	1.34		1.02			1.34
33-33.9	1.31	1.36		1.03			1.36
34-34.9	1.33	1.38		1.04			1.38
35-35.9	1.35	1.40		1.05			1.40
36-36.9	1.37	1.42		1.06			
37-37.9	1.39	1.44		1.07			
38-38.9	1.41	1.46		1.08			
39-39.9	1.43	1.48		1.09			
40 and above	1.45	1.50		1.10			

SOUTH TEXAS AND SOUTHWEST TEXAS TABLE EXPLANATION

Column 1 Mirando:
Humble Oil & Refining Co., 5-21-41, includes Blanchard, Bridwell, Colorado, Comitas, Eagle Hill, Escobas, Fitzsimmons, Glen, Government Wells (North and South), Heyser, Hoffman, Kelsey, Kohler, Loma Novia, Lundell, Manila, Mirando Valley, Placedo, Randado, Sarnosa, and Tesoro.
Magnolia Petroleum Co., 5-21-41.
Continental Oil Co., 7-1-41, includes Hoffman, Government Wells (North and South), Lopez, Moco, Colmena, Seven Sisters, South Seven Sisters, Loma Novia, Conoco, Driscoll, O'Hern, Piedra Lumbre, and Taranchauas.
American Mineral Spirits Co., 5-21-41, includes Adami and Munson.
Republic Oil Refining Co., 5-21-41, includes Heyser field crude.

Column 2 Refugio:
Continental Oil Co., 7-1-41, includes Minnie Bock, Clara Driscoll, South Clara Driscoll, Driscoll Ranch, Orange Grove and Wade City.
Humble Oil & Refining Co., 5-21-41, includes East White Point, Greta, Melon Creek, O'Connor-McFaddin, Plymouth Saxet, Taft, and Tom O'Connor.
American Mineral Spirits Co., 5-21-41, includes Plymouth, Taft, and East White Point.

Column 3 Refugio:
Texas Co., 5-21-41, includes Greta, Saxet, and Taft.

Column 4 La Rosa:
American Mineral Spirits Co., 3-29-41.

Column 5 Duval-Mirando:
Sun Oil Co., 5-21-41.

Column 6 Duval-Mirando:
Texas Co., 5-21-41.

Column 7 Nueces County:
American Mineral Spirits Co., 5-21-41.
Republic Oil Refining Co., 5-21-41.

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS GRAVITY TABLES

	1	2	3	4	5	6	7	8	9
Below 20	....	....	....	....	$0.80	....	....	....	$0.80
20-20.9	....	....	....	....	.82	....	....	....	.82
Below 21	....	....	....	....	....	$0.85	....	....	....
21-21.9	....	....	....	....	.84	.87	....	....	.84
22-22.9	....	....	....	....	.86	.89	....	....	.86
23-23.9	....	....	....	....	.88	.91	....	....	.88
24-24.9	....	....	....	....	.90	.93	....	....	.90
Below 25	....	....	$0.88	....	....	....	$0.89	$0.95	....
25-25.9	$0.95	....	.90	$0.97	.92	.95	.91	.97	.92
26-26.9	.97	....	.92	.99	....	.97	.93	.99	.92
27-27.9	.99	....	.94	1.01	....	.99	.95	1.01	.92
28-28.9	1.01	$1.01	.96	1.03	....	1.01	.97	1.03	.92
29-29.9	1.03	1.03	.98	1.05	....	1.03	.99	1.05	.92
30-30.9	1.05	1.05	1.00	1.07	....	1.05	1.01	1.07	.92
31-31.9	1.07	1.07	1.02	1.09	....	1.07	1.03	1.09	.92
32-32.9	1.09	1.09	1.04	1.11	....	1.09	1.05	1.11	.92
33-33.9	1.11	1.11	1.06	1.13	....	1.11	1.07	1.13	.92
34-34.9	1.13	1.13	1.08	1.15	....	1.13	1.09	1.15	.92
35-35.9	1.15	1.15	1.10	1.17	....	1.15	1.11	1.17	.92
36-36.9	1.17	1.17	1.12	1.19	....	1.17	1.13	1.19	.92
37-37.9	1.19	1.19	1.14	1.21	....	1.19	1.15	1.21	.92
38-38.9	1.21	1.21	1.16	1.23	....	1.21	1.17	1.23	.92
39-39.9	1.23	1.23	1.18	1.25	....	1.23	1.19	1.25	.92
40 and above	1.25	1.25	1.20	1.27	....	1.25	1.21	1.27	.92

NORTH TEXAS, WEST CENTRAL TEXAS, EAST CENTRAL TEXAS TABLE EXPLANATION

Column 1 West Central and North:
Humble Oil & Refining Co., 5-22-43, includes Brown, Callahan, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, and Throckmorton counties.
Panhandle Refining Co., 5-22-43, in Leuders area.
Gulf Refining Co., 5-22-43.
Sinclair Prairie Oil Marketing Co., 5-22-43.

Column 2 North Texas:
Continental Oil Co., 5-22-43.
Magnolia Petroleum Co., 5-22-43.
Panhandle Refining Co., 5-22-43.
Bell Oil & Gas Co., 5-22-43.
Texas Co., 5-22-43.

Column 3 East Central:
Magnolia Petroleum Co., 5-21-41, includes Cass, Panola, and Rodessa (Texas and Louisiana), and Miller County, Arkansas.
Gulf Refining Co., 5-21-41, includes Rodessa, Texas.

Column 4 East Central:
Humble Oil & Refining Co., 5-21-41, includes Anderson, Cherokee, Limestone, and Navarro counties and the Navarro Crossing field.

Column 5 East Central:
Humble Oil & Refining Co., 5-21-41, includes Hawkins field.

Column 6 North Texas:
Stanolind Oil Purchasing Co., 5-22-43.

Column 7 Fisher County:
Shell Oil Co., Inc., 12-11-41.

Column 8 Mexia:
Sinclair Prairie Oil Marketing Co., 5-30-41.

Column 9 Talco:
Magnolia Petroleum Co., 5-28-43.
Humble Oil & Refining Co., 5-28-43.

TEXAS FLAT-PRICE FIELDS

Agua Dulce (light), Benavides, Longhorn, Southland, and Sweden, 5-21-41 $1.35
Agua Dulce (heavy), 10-16-41 ..... $1.25
Republic Oil Refining Co., 5-21-41.
Alfred and Magnolia City $1.35
Continental Oil Co., 5-21-41.
Alice, Benavides (North Sweden), Ben Bolt, Clark-Mull, Sun, and Tom Graham $1.30
Humble Oil & Refining Co., 5-21-41.
Batson (new), Humble (35° and above), Fig Ridge, Hardin, Hull (25° and above), La Belle, North Dayton (25° and above), Seabreeze South China, West Orange, Willow Slough and Oyster Bayou $1.30
Sun Oil Co., 5-21-41.
Cass County $1.30
Texas Co., 5-21-41.
Cayuga, Anderson County $0.90
Pan American Production Co., 5-21-41.
Chapel Hill, Smith County:
Crude distillate $1.30
Crude oil 1.18
Chapel Hill Gas System, 11-7-41.
Clay Creek, Washington County $1.00
Sun Oil Co., 5-21-41.
Cleveland, Liberty County $1.38
Magnolia Petroleum Co., 5-21-41.
Conroe, Montgomery County $1.42
Humble Oil & Refining Co., 5-21-41.
Tide Water Associated Oil Co., 5-21-41
Sun Oil Co., 5-21-41.
Texas Co., 5-21-41.
Cotton Lake (South) $1.36
Sun Oil Co., 5-21-41:
East Texas and Flag Lake* $1.20
*Humble Oil & Refining Co., 5-21-41.
Pan American Production Co., 5-21-41
Tide Water Associated Oil Co., 5-21-41
Gulf Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
Sinclair Prairie Oil Marketing, 5-21-41
Shell Oil Co., Inc., 5-20-41.
Sun Oil Co., 5-21-41.
Texas Co., 5-21-41.
Stanolind Oil Purchasing Co.
Esperson (35° and above), South Esperson $1.30
Sun Oil Co., 5-21-41.
Flour Bluff, East Flour Bluff $1.33
Humble Oil & Refining Co., 5-21-41.
Hockley and Cochran $0.87
Texas Co., 5-21-41.
Livingston and Mercy $1.28
Shell Oil Co., Inc., 5-20-41.
Long Lake $1.32
Sinclair Prairie Oil Marketing, 5-21-41.
Luby $1.28
American Mineral Spirits Co., 5-21-41.
Luling $1.08
Magnolia Petroleum Co., 5-21-41.
Lytton Springs $1.17
Magnolia Petroleum Co., 5-21-41.
Salt Flat, North Salt Flat, Darst Creek*, Hilbig, Clark, Carroll, and Zoborski $1.41
Humble Oil & Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
*Texas Co., 5-21-41.
Rincon (North), Sun, North Sun and Garcia $1.28
Sun Oil Co., 5-21-41.
Yturria $1.43
Sun Oil Co., 3-19-42.
Talco $0.79
Humble Oil & Refining Co., 5-21-41.
Magnolia Petroleum Co., 5-21-41.
Tomball and Satsuma $1.40
Humble Oil & Refining Co., 5-21-41.
*Magnolia Petroleum Co., 5-21-41.
Stanolind Oil Purchasing Co., 4-1-41.
Van, Van Zandt County $1.08
Humble Oil & Refining Co., 5-21-41.
Pure Oil Co., 5-21-41.
Yates (regular) $0.98
Humble Oil & Refining Co., 5-21-41.
Gulf Refining Co., 5-21-41.
Shell Oil Co., Inc., 5-20-41.
Yates (shallow) $0.83
Shell Oil Co., Inc., 5-20-41.

TEXAS GULF COAST GRAVITY TABLES

	(1)	(2)	(3)	(4)	(5)
Below 20	$1.06	$1.06	....	$0.98	$0.93
20-20.9	1.08	1.08	....	1.00	.95
Below 21	....	....	$1.08	....	....
21-21.9	1.10	1.10	1.10	1.02	.97
22-22.9	1.12	1.12	1.12	1.04	.99
23-23.9	1.14	1.14	1.14	1.06	1.01
24-24.9	1.16	1.16	1.16	1.08	1.03
25-25.9	1.18	1.18	1.18	1.10	1.05
26-26.9	1.20	1.20	1.20	1.12	1.07
27-27.9	1.22	1.22	1.22	1.14	1.09
28-28.9	1.24	1.24	1.24	1.16	1.11
29-29.9	1.26	1.26	1.26	1.18	1.13
30-30.9	1.28	1.28	1.28	1.20	1.15
31-31.9	1.30	1.30	1.30	1.22	1.17
32-32.9	1.32	1.32	1.32	1.24	1.19
33-33.9	1.34	1.34	1.34	1.26	1.21
34-34.9	1.36	1.36	1.36	1.28	1.23
35-35.9	1.38	....	1.38	1.30	1.25
36-36.9	1.40	....	1.40	1.32	1.27
37-37.9	1.42	....	1.42	1.34	1.29
38-38.9	1.44	....	1.44	1.36	1.31
39-39.9	1.46	....	1.46	1.38	1.33
40 and above	1.48	....	1.48	1.40	1.35

TEXAS GULF COAST GRAVITY TABLE EXPLANATION

Column 1:
Humble Oil & Refining Co., 5-21-41, in-

cludes Amelia, Clear Lake, Goose Creek, Hastings, Magnet, Mykawa (new), Raccoon Bend, South Thompson, Sugarland, Thompson, and Webster fields.

Stanolind Oil & Gas Co., 5-21-41, includes West Beaumont, High Island, and Spindletop.

Sinclair Prairie Oil Marketing Co., 5-21-41.

Stanolind Oil Purchasing Co., 4-9-42, includes Clinton and Lake Creek.

Pure Oil Co., 4-21-41, includes Louise and Ganado.

Gulf Refining Co., 5-21-41, includes Spindletop, Sour Lake, Lovells Lake, West Beaumont, Goose Creek, South Liberty, Big Creek, Blue Ridge, Fannett, Moore, Barbers Hill, Hankamer, Thompson, Lochridge, Dyersdale, and Hull (old).

Sun Oil Co., 5-21-41, includes Barbers Hill, Batson (old), Bayou Blue, Chacahoula, Cotton Lake, Esperson (below 35° gravity), Fausse Point, Goose Creek, Greens Lake, Hackberry (east and west), Hull (below 35°), Humble (below 35°), Nome, North Dayton (below 25°), Orange, Saratoga, Sour Lake, South Liberty, and Vinton.

Column 2:

Texas Co., 5-21-41, includes Arriola, Ganado, Hamman, Hillje, Humble, Kubela, Magnet, Manvel, Markham, Mauritz, Old Ocean, Pickett Ridge, Port Neches, Sour Lake, West Columbia, and Withers.

Column 3:

Pan American Production Co., 5-21-41, includes Hastings and South Houston.

Stanolind Oil & Gas Co., 4-1-41, includes High Island, Spindletop, Hastings, and South Houston.

Column 4:

Humble Oil & Refining Co., 5-21-41, includes Anahuac, Angleton, Cedar Point Fishers' Reef, Hull (new and old), Pierce Junction, Red Fish Reef, and Turtle Bay.

Gulf Refining Co., 5-21-41, includes Anahuac, Hull (new), Thompson (deep), Pierce Junction, and Orange.

Sun Oil Co., 5-21-41, includes Anahuac, Caplen and Turtle Bay.

Humble Oil & Refining Co., 3-29-41, includes Dickinson, Gillock, Hardin, League City, and Rowan.

Pure Oil Co., 2-23-43, at Alief field.

Column 5:

Pan American Production Co., 5-21-41, includes Gillock, except scale starts at 95 cents below 21°.

Stanolind Oil Purchasing Co., 5-21-41, includes Fairbanks, North Houston, and Roslyn.

WEST TEXAS, PANHANDLE, AND NEW MEXICO GRAVITY TABLES

	1	2	3	4	5	6	7	8	9	10	11
Below 20	$0.70	....	....	....	....	....	....	....	$0.70	$0.80	....
20-20.9	.72	....	....	....	....	....	....	....	.72	.82	....
21-21.9	.74	....	....	....	....	....	....	....	.74	.84	....
22-22.9	.76	....	....	....	....	....	....	....	.76	.86	....
23-23.9	.78	....	$0.78	....	....	....	....	....	.78	.88	....
24-24.9	.80	....	.80	....	....	....	....	....	.80	.90	....
Below 25	....	$0.80	....	....	....	....	$0.80	....	....	....	$0.90
25-25.9	.82	.82	.82	....	$0.82	....	.82	....	.82	.92	.92
26-26.9	.84	.84	.84	....	.84	....	.84	....	.84	.94	.94
27-27.9	.86	.86	.86	....	.86	....	.86	....	.86	.96	.96
28-28.9	.88	.88	.88	$0.98	.88	....	.88	$0.88	.88	.98	.98
29-29.9	.90	.90	.90	1.00	.90	....	.90	.90	.90	1.00	1.00
30-30.9	.92	.92	.92	1.02	.92	....	.92	.92	.92	1.02	1.02
31-31.9	.94	.94	.94	1.04	.94	....	.94	.94	.94	1.04	1.04
32-32.9	.96	.96	.96	1.06	.96	....	.96	.96	.96	1.06	1.06
33-33.9	.98	.98	.98	1.08	.98	....	.98	.98	.98	1.08	1.08
34-34.9	1.00	1.00	1.00	1.10	1.00	1.10	1.00	1.00	1.00	1.10	1.10
35-35.9	1.02	1.02	1.02	1.12	1.02	1.12	1.02	1.02	1.02	1.12	1.12
36-36.9	1.04	1.04	1.04	1.14	1.04	1.14	1.04	1.04	1.04	1.14	1.14
37-37.9	1.06	1.06	....	1.16	1.06	1.16	....	1.06	....	1.16	1.16
38-38.9	1.08	1.08	....	1.18	1.08	1.18	....	1.08	....	1.18	1.18
39-39.9	1.10	1.10	....	1.20	1.10	1.20	....	1.10	....	1.20	1.20
40 and above	1.12	1.12	....	1.22	1.12	1.22	....	1.12	....	1.22	1.22

WEST TEXAS, PANHANDLE AND NEW MEXICO TABLE EXPLANATION

Column 1:

Humble Oil & Refining Co., 5-21-41, includes Andrews, Crane, Crockett, Ector, Gaines, Glasscock, Howard, Reagan, Upton, Winkler, and Yoakum counties, West Texas, and Lea County, New Mexico.

Gulf Refining Co., 5-21-41, includes Crane, Ector, Upton, Ward, and Winkler counties, West Texas.

Stanolind Oil Purchasing Co., 5-1-43, at Slaughter and Cedar Lake.

Column 2:

Sinclair Prairie Oil Marketing Co., 5-21-41, includes West Texas and Lea County, New Mexico. Effective 5-29-41, in Eddy County, New Mexico.

Magnolia Petroleum Co., 5-21-41, includes Upton, Howard, Glasscock, Mitchell, Winkler, Cochran, Hockley, Yoakum and Gaines counties.

Column 3:

Texas Co., 5-21-41, includes Crane and Winkler counties, Texas, and Lea County, New Mexico.

Column 4 Texas Panhandle:

Magnolia Petroleum Co., 6-16-43.

Continental Oil Co., 6-16-43.*

Phillips Petroleum Co., 6-16-43.*

*Starts at $1 for 29-29.9.

Column 5 Winkler and Lea:

Stanolind Oil & Gas Co., 5-21-41, includes Winkler County only.

Gulf Refining Co., 5-21-41, includes Lea County, New Mexico, only.

Column 6 Gray County:

Texas Co., 6-16-43.

H. F. Wilcox Oil & Gas Co., 6-16-43.

Column 7 Lea County:

Magnolia Petroleum Co., 5-21-41.

Column 8 Eddy County:

Continental Oil Co., 5-30-41.

Column 9:

Shell Oil Co., Inc., 5-20-41, includes Crane, Ector, Howard, Glasscock, Upton, Winkler, and Yoakum counties, Texas, and Lea County, New Mexico.

Column 10 Texas Panhandle:

Humble Oil & Refining Co., 6-16-43.

Gulf Refining Co., 6-16-43.

Column 11 Panhandle:

Sinclair Prairie Oil Marketing Co. 6-16-43.

EASTERN STATES

Pennsylvania and Ohio

South Penn Oil Co.:
- National lines, 3-26-42 ..... $3.00
- Southwest Penn, 3-26-42 ..... 2.88
- Eureka lines, 3-26-42 ..... 2.98
- Corning grade, 5-27-41 ..... 1.31

Tide Water Associated Oil Co.:
- Bradford, 3-26-42 ..... $3.00
- Allegany, N. Y., 3-26-42 ..... 3.00

Pennzoil Co.:
- Group A, 3-26-42 ..... $2.93
- Group B, 3-26-42 ..... 2.93
- Group C, 3-26-42 ..... 2.91
- Group D, 3-26-42 ..... 2.90
- Group E, 3-26-42 ..... 2.88

Quaker State Oil Refining Corp.:
- In Buckeye lines, 3-26-42 ..... $2.88
- In Eureka lines, 3-26-42 ..... 2.98

Kentucky

Ashland Oil & Transportation Co., 6-19-41:
- Big Sandy River (8-9-43) $1.43
- Kentucky River (6-19-41) 1.43

Sohio Corp., 5-21-41:
- Birk City $1.33

West Virginia

Pure Oil Co.:
- Cabin and Kelly Creek, 3-27-42 ..... $2.88

MIDDLE WEST FLAT PRICES

Illinois and Indiana

Ohio Oil Co.:
- Illinois basin, 5-21-41 ..... $1.37
- Eastern Illinois, 5-21-41 ..... $1.23
- Western Indiana, 5-21-41 ..... 1.23

Magnolia Petroleum Co.:
- Illinois basin, 5-21-41 ..... $1.37

Carter Oil Co.:
- Illinois (Louden), 5-21-41 ..... $1.37

Sohio Corp.:
- Illinois basin, 5-21-41 ..... $1.37

Texas Co.:
- Illinois basin, 5-21-41 ..... $1.37

Gulf Refining Co.:
- Illinois basin, 5-21-41 ..... $1.37

STANDARD OIL CO. OF CALIFORNIA CRUDE-OIL PRICES EFFECTIVE APRIL 1, 1943

Gravity	Signal Hill (Long Beach)	Wilmington	Seal Beach	Huntington Beach	Inglewood	Olinda-Brea Canyon	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	Greeley, Canal, Wasco	Coles Levee	Mountain View	Elk Hills, Buena Vista Hills Midway-Sunset, Lakeview area	Coalinga	Kettleman Hills	Elwood Terrace
14-14.9	....	$0.93	....	$0.96	....	$0.95	$0.95	$0.95	$0.95	$0.97	....	....	....	....	....	$0.98	$0.98	....	....
15-15.9	....	.96	....	1.00	$1.01	.97	.97	.96	.97	.97	....	....	....	....	....	.98	.98	....	....
16-16.9	..	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	....	.98	.98	....	....
17-17.9	....	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	....	.98	.98	....	....
18-18.9	$0.93	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	....	.98	.98	....	....
19-19.9	.93	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	$0.98	.98	.98	....	....
20-20.9	.93	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	.98	.98	.98	....	....
21-21.9	.93	.96	....	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	.98	.98	.98	....	....
22-22.9	.96	.98	$0.88	1.00	1.01	.97	.97	.96	.97	.97	....	....	....	....	.98	.98	.98	....	....
23-23.9	1.00	1.02	.92	1.02	1.01	.98	.97	.98	1.00	.97	....	....	....	....	.98	.99	.98	....	....
24-24.9	1.03	1.06	.97	1.05	1.04	1.01	1.01	1.02	1.03	.97	$0.99	....	....	....	.98	1.03	.98	....	....
25-25.9	1.07	1.09	1.01	1.08	1.07	1.04	1.05	1.06	1.07	.98	1.02	....	....	....	.98	1.07	.98	....	....
26-26.9	1.11	1.13	1.06	1.11	1.10	1.08	1.09	1.10	1.11	1.01	1.06	....	....	....	.98	1.11	.98	....	....
27-27.9	1.15	1.15	1.10	1.14	1.14	1.11	1.13	....	1.15	1.05	1.10	$1.04	....	....	1.01	1.15	.98	....	....
28-28.9	1.18	1.18	1.15	1.17	1.17	1.14	1.17	....	....	1.08	1.13	1.08	....	....	1.04	1.19	1.00	....	....
29-29.9	1.20	1.21	1.19	1.20	1.20	....	....	....	....	1.12	1.17	1.12	....	....	1.07	1.24	1.02	....	....
30-30.9	1.23	1.24	....	1.23	1.22	....	....	....	....	1.15	1.21	1.15	$1.01	$1.00	1.10	1.28	1.04	....	f.o.b.
31-31.9	....	....	....	....	1.24	....	....	....	....	1.19	1.24	1.19	1.04	1.12	1.14	....	1.06	....	ship
32-32.9	....	....	....	....	....	....	....	....	....	1.23	1.28	1.23	1.07	1.14	1.17	....	1.09	....	....
33-33.9	....	....	....	....	....	....	....	....	....	1.27	....	1.26	1.10	1.17	....	....	1.11	....	$1.22
34-34.9	....	....	....	....	....	....	....	....	....	1.31	....	1.30	1.13	1.20	....	....	1.13	....	1.25
35-35.9	....	....	....	....	....	....	....	....	....	1.35	....	....	1.16	1.23	....	....	....	$1.23	1.28
36-36.9	....	....	....	....	....	....	....	....	....	1.39	....	....	1.19	1.25	....	....	....	1.26	....
37-37.9	....	....	....	....	....	....	....	....	....	1.43	....	....	1.22	....	....	....	....	1.29	....
38-38.9	....	....	....	....	....	....	....	....	....	1.47	....	....	1.25	....	....	....	....	....	....
39-39.9	....	....	....	....	....	....	....	....	....	1.51	....	....	....	....	....	....	....	....	....
40-40.9	....	....	....	....	....	....	....	....	....	1.53	....	....	....	....	....	....	....	....	....

Standard posts 94 cents for 12 gravity and 96 cents for 13 gravity in San Joaquin fields, effective May 25, 1943.

KANSAS

Reno Wildcat Shows For Large Well in the Viola

A NEW Viola lime pool was found in southeastern Reno County but lack of storage delayed production tests. The well is Phillips Petroleum Co. 1 Manning, SW SW NW 34-25-4w, about 2 miles northeast of the Hilger pool. Five-inch casing was set at 4,099 ft. and when the plug was drilled the hole filled 3,800 ft. with oil in 3½ hours. When shut in it filled to the top. The well has every indication of a better-than-average discovery. It has not been acidized as yet. Production at Hilger is in the lime at approximately the same depth. Phillips was said to have 1,650 acres of leases around the well.

KANSAS WILDCAT COMPLETIONS

Cowley County: Earl Wakefield 1 Orr, W½ SW NW 35-32-3e, dry, T.D. 3,212 ft., Bartlesville 3,188 ft.

Adair & Morton 1 Woner, NE SE SW 29-30-4e, dry, T.D. 2,910 ft., Bartlesville 2,806 ft., recovered 6 gal. oil.

Butler County: Branine & Goering 1-B Joseph, SE SW NW 18-25-4e, pumped 60 bbl., 46-gravity, Mississippi lime 2,681-87 ft., discovery of S. Potwin.

Dickinson County: Auto-Ordance 1 Seddergreen, NE SE SE 34-14-1e, dry, T.D. 2,476 ft., Kansas City 1,790 ft., Burgess 2,433 ft., Mississippi lime 2,438 ft.

Graham County: W. C. Broderick 1 Rice, NW NW NE 25-8-23w, dry, T.D. 3,975 ft., Lansing 3,442 ft., Arbuckle 3,900 ft.

Jefferson County: Sagamore Oil & Gas 1 Snyder, SW NW 31-9-19e, dry, T.D 1,726 ft., McLouth sand 1,520 ft., Mississippi lime 1,550 ft.

McPherson County: Westgate-Greenland 1 Johnson, S½ SW NW 4-18-1w, dry, T.D. 2,759 ft., Lansing 2,155 ft., chat 2,732 ft.

R. E. Day 1 Wade, W½ NE SE 9-19-5w, dry, T.D. 3,965 ft., Lansing 2,975 ft., chat 3,403 ft., Viola 3,865 ft., Simpson 3,899 ft.

Rooks County: Texas 1 McQueen, NW NW SE 16-6-18w, dry, T.D. 3,596 ft., Lansing 3,182 ft., show oil 3,185 ft., Arbuckle 3,558 ft.

Rice County: Skelly 1 Guldner, NW SW NE 8-18-9w, dry, T.D. 3,270 ft., Lansing 2,888 ft., Arbuckle 3,253 ft.

Rush County: Falcon-Seaboard 1 Urban, SE NE SE 19-16-17w, dry, T.D. 3,522 ft., Kansas City 3,288 ft., show oil 3,315 ft., sand 3,480 ft., show black oil 3,480 ft.

Sedgwick County: Continental Oil 1 Mannebach, NE NE NE 16-26-2w, dry, T.D. 4,068 ft., Lansink 2,595 ft., Kansas City 2,835 ft., Viola 3,942 ft., Arbuckle 4,051 ft.

MISSOURI

ST. JOSEPH, Mo.—Cities Service Oil Co. is preparing to drill its first offset in the Bartlesville sand pool it opened last December scutheast of Tarkio in Atchison County, Missouri. The company's 2 Jim Cook will be drilled in NE NW NW 32-65n-39w, as an east offset to the discovery well. Claude McQueen of Rushville, Mo., will drill the well with his portable rotary rig. The discovery well has been pumping from the Bartlesville at the rate of approximately 20 bbl. of oil per day.

Stanolind Oil & Gas Co. will drill 1 Laura Penney in 1-65n-31w, Worth County, Missouri, about 4 miles southeast of Grant City.

NORTH LOUISIANA

Cotton Valley Found Productive at Homer

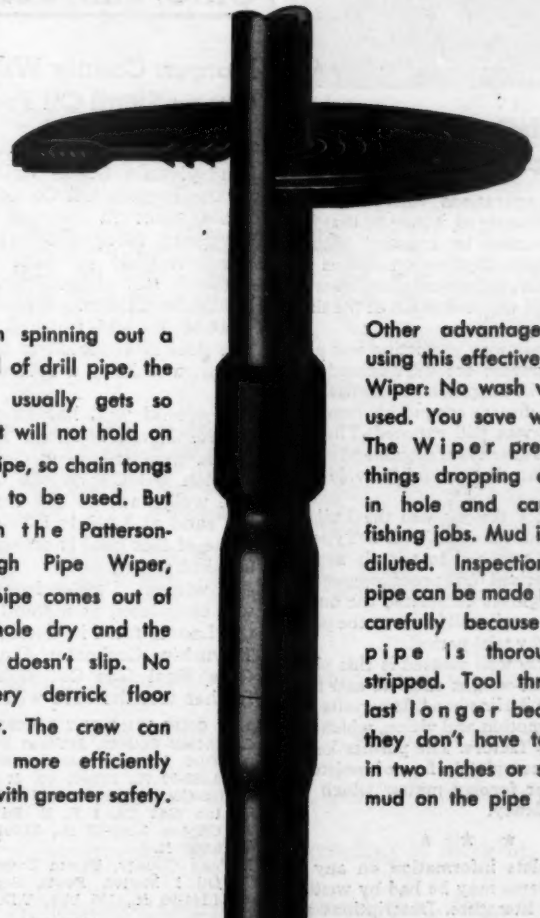
SHREVEPORT, La.—The south flank of the Homer pool in Claiborne Parish was given a new pay zone last week. Frankel Brothers 1 Muslow, NE NW 30-21n-7w, flowed from 2 to 5 bbl. an hour through perforations in the Cotton Valley zone at 4,315-20 ft., with an additional 17 ft. of the formation untested, as well as other levels returning a show of oil. Previous production has been in sand from 1,250 to around 2,100 ft. The significance of the discovery is as yet uncertain as a few tests have previously been drilled to the Cotton Valley which were found dry.

NORTH LOUISIANA WILDCAT COMPLETIONS

Claiborne Parish: Benedum-Trees 1 G. H. Vaughn, NE NW 23-23n-5w, dry, T.D. 7,501 ft., James sand 4,300 ft., Pettit lime 4,946 ft.

Webster Parish, between Cotton Valley and

PIPE WIPER AVOIDS ROPE SLIPPAGE



When spinning out a stand of drill pipe, the rope usually gets so wet it will not hold on the pipe, so chain tongs have to be used. But with the Patterson-Ballagh Pipe Wiper, the pipe comes out of the hole dry and the rope doesn't slip. No slippery derrick floor either. The crew can work more efficiently and with greater safety.

Other advantages of using this effective Pipe Wiper: No wash water used. You save water. The Wiper prevents things dropping down in hole and causing fishing jobs. Mud is not diluted. Inspection of pipe can be made more carefully because the pipe is thoroughly stripped. Tool threads last longer because they don't have to set in two inches or so of mud on the pipe rack.

PATTERSON-BALLAGH
PIPE and TUBING WIPER

Patterson-Ballagh Corp. Los Angeles • Houston • New York City

What's New IN SAFETY

NEWS ABOUT SAFETY EQUIPMENT AND METHODS

Airline hood
solves dust problem

On certain operations where harmful dusts are encountered, it may be that full protection cannot be supplied with a respirator alone. One such case was reported by a large chemical plant where a workman was exposed much of the time to arsenic dust.

While respiratory protection was provided, the arsenic ore dust caused the workman to be hospitalized because of a serious skin disease around his face and body which was still exposed. The superintendent asked for recommendations on equipment that would provide full protection.

Adopted for the job was the Bullard Airline Hood, together with a Type A Air purifier attached to the air supply line. A rubberized dust proof jumper suit and rubber gloves completed the outfit. This equipment is still in use at the plant after a lengthy trial period.

Particularly well pleased is this plant with the light-weight comfort and full-vision of the Airline hood. It permits full freedom of motion and vision, which are added safety factors. The purifier keeps the air line completely free of moisture, oil and other foreign matter which increases efficiency.

★ ★ ★

More complete information on any of the above items may be had by writing for product literature. Descriptions are condensed from the bulletin "What's New in Safety," which will be mailed to you monthly on request. 6-8-43

E. D. BULLARD CO.

275 EIGHTH STREET, SAN FRANCISCO, 3, CALIF.

LOS ANGELES · CHICAGO · HOUSTON · SEATTLE

SALT LAKE CITY · DENVER · EL PASO · NEW YORK

EVERYTHING BULLARD IN SAFETY

Haynesville pools: J. J. Roberts et al 1 Garland, NE SW 24-22n-9w, dry, T.D. 3,025 ft., Nacatoch 2,045 ft., Blossom 2,842 ft.

MISSISSIPPI

JACKSON, Miss.—Gulf Refining Co. 1 Aden Davis, Wayne County wildcat in 2-9n-9w, was preparing to test a squeeze job before perforating for another oil test. Total depth is 7,100 ft.

California Co. 1 Hettie Smith unit, 4-7n-7e, Lincoln County, was coring at 9,426 ft. in sand and shale. An electrical survey, run from 9,274 ft., showed the top of the Cretaceous at 8,265 ft. The same company's 1 G. T. Smith, in the same area, pumped 140 bbl. of fluid in 24 hours, 3½ per cent of it salt water. The fluid level was 8,000 ft.

OHIO, KENTUCKY

Morgan County Wildcat Opens Small Oil Pool

ZANESVILLE, Ohio.—A 105-bbl. Pennsylvania Grade well, completed by the Preston Oil Co. on the Milton Fouts tract in Section 24, Bloom Township, Morgan County, opens up the first Ohio oil pool east of the southern end of the Brush Creek gas field. The Clinton sand was found at 4,144-98 ft. and finished at 4,202 ft. The pool is expected to be of limited extent and have a reserve of 320,000 bbl.

A second well has been completed in the North Madison Pennsylvania Grade pool in Perry County by the Preston Oil Co. on the Combs tract. The well made 66 bbl. from the Clinton sand at 3,299 to 3,365 ft. The reserve of this pool is estimated at 640,000 bbl.

A wildcat, 5 miles from production, was completed as a small gas well on the Landis farm in Section 5, Jackson Township, Coshocton County, by the Ohio Fuel Gas Co. Other wells to further test the area will be drilled.

OHIO WILDCAT COMPLETIONS

Coshocton County, Jackson Township: Ohio Fuel 1 Stella Landis, Sec. 5, Clinton 3,562-99 ft., 184,000 cu. ft., T.D. 3,666 ft.

Gallia County, Greenfield Township: Trenton Gas Co. 1 E. E. Edwards, Sec. 7, Clinton 2,925-35 ft., 33,901 cu. ft., T.D 2,935 ft.

Morgan County, Bloom Township: Preston Oil 1 Melton Fouts, Sec. 24, Clinton 4,144-98 ft., 105 bbl., T.D. 4,202 ft.

WESTERN KENTUCKY

OWENSBORO, Ky.—Six wells were completed in the western Kentucky fields in the past week, three producing wells and three dry holes. The oil wells averaged 100 bbl. per day in initial production.

In McLean County, just north of Livermore, H. H. Vickers et al 1 James Snyder, a wildcat, was flowing naturally through casing at the rate of 10 bbl. of oil per hour from Tar Springs sand at 1,192-1,205 ft. It is ½ mile from other production.

WESTERN KENTUCKY WILDCAT COMPLETIONS

Union County: Trans-Tex 1 T. N. Wheatley, ½ mi. N of Waverly, dry at 2,770 ft., Barlow lime 2,263-67 ft., Ste. Genevieve lime top 2,578 ft.

EASTERN KENTUCKY

ASHLAND, Ky.—One gas well was completed and a dry hole reported.

Kentucky West Virginia Gas Co. 722 J. W. Blankenship, Johns Creek, Pike County. T.D. 1,480 ft., open flow 1,425,000 cu. ft. gas daily from Big lime.

Virginia Gas & Oil Co. 5 J. B. Black on Wolf Creek, Martin County, dry. Next test well to be on the A. L. Moore land, at Pigeon Roost).

INDIANA

EVANSVILLE, Ind.—Two wells were completed in Gibson County good for 25 bbl. each, and one dry hole was drilled each in Posey and Vanderburgh counties. All the completions were in known pools.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, General Land Office, District Land Office, Salt Lake City, Utah. Notice is hereby given that the lands herein described within the known geologic structure of the Cisco Dome Gas Field, Utah, are offered to qualified bidders of the highest amounts offered per acre as a bonus for the privilege of leasing the land under section 17 of the leasing act, as amended by the act of August 21, 1935 (49 Stat. 674, 30 U.S.C. 226) at a sale to be held in the United States Land Office at Salt Lake City, Utah, at 10 a.m., August 26, 1943, in the following units: Parcel No. 1, T. 20 S., R. 21 E., sec. 3, lots 1, 2, S½NE¼, SE¼; sec. 10, E½. Parcel No. 2, T. 20 S., R. 21 E., sec. 3, lots 3, 4, S½NW¼, SW¼; sec. 10, W½. Parcel No. 3, T. 20 S., R. 21 E., sec. 4, SE¼NE¼, NE¼SE¼, S½SE¼; sec. 9, E½. Parcel No. 4, T. 20 S., R. 22 E., sec. 20, W½SE¼; sec. 29, E½. Parcel No. 5, T. 20 S., R. 22 E., sec. 20, SW¼; sec. 29, W½. Parcel No. 6, T. 20 S., R. 22 E., sec. 30, lots 1, 2, 3, 4, E½, E½W½. Parcel No. 7, T. 20 S., R. 21 E., sec. 22, SE¼SW¼; sec. 26, N½, N½SE¼, SE¼SE¼; sec. 27, N½NE¼, SE¼NE¼. Parcel No. 8, T. 20 S., R. 22 E., sec. 31, lots 1, 2, 3, E½, E½NE¼, NE¼SW¼; T. 21 S., R. 22 E., sec. 5, NW¼NW¼ (unsurveyed); sec. 6, NE¼NE¼ (unsurveyed). Each lease will be made subject to the unit plan for the Cisco Dome Unit Area, Utah, approved June 6, 1942. Mimeographed copies of the plan will be available for distribution to parties interested in bidding at the local land office in Salt Lake City, Utah, and offices of the oil and gas leasing division, Geological Survey at Salt Lake City, Utah, Casper, Wyoming, and Washington, D. C. Upon acceptance by the Secretary of the Interior of any bid for the unsurveyed tracts they will be surveyed at Government expense. Each successful bidder must deposit on date of sale with the officer in charge of the sale a certified check on a solvent bank or cash for one-fifth of the amount bid by him and file a showing of qualifications to receive a lease as required by section 7 of Circular 1386. The remainder of the bonus bid and annual rental must be paid prior to the issuance of the lease. Each parcel will be offered for sale separately, but bidders may submit bids for two or more parcels regardless of the acreage involved, since each lease will be made subject to and operated under a prescribed unit plan of development and operation. Bids may also be submitted by mail provided they are accompanied by one-fifth of the bonus bid and a showing of qualifications of the bidder. The envelope must be plainly marked for opening on the day and hour of the sale. Bidders are warned against violation of section 80, United States Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids in the discretion of the Secretary of the Interior. Scott P. Stewart, Register.

TEXAS GULF COAST

Joint Operation to Study Condensate Well Problems

HOUSTON, Tex. — Oil companies with distillate interests have joined in a cooperative research program dealing with problems in condensate-well production, to be carried out in the Katy gas field unit of Waller County. Equipment for conducting the experiments is being installed at well No. 9 of the Katy unit under the direction of representatives of Stanolind Oil & Gas Co., which serves as operator.

Harris County.—Cities Service Oil Co. has staked location for a wildcat, 1 J. A. Sharman, in the William Mowery Survey. Continental Oil Co. 1 Millenger, drilling at 6,910 ft. in shale, topped the Textularia Warreni at 4,495 ft., Massilina Pratti 5,552 ft., Hockleynesis 5,582 ft. Ludeau Oil Co. 1 Dr. J. E. Ludeau, 3½ miles north of Houston, was waiting on orders. It was at 3,300 ft. in shale when the recent coastal hurricane wrecked the derrick.

Jackson County.—British American Oil Producing Co. was moving in at 1 Four-Way ranch, northeast of the Lolita field area. Ira Knowles et al were waiting on rig at 1 J. Lesiker, in the I.&G.N. Survey. No shows had been reported at Humble Oil & Refining Co. and Shell Oil Co., Inc., 1-C McFaddin Trust, 5 miles southeast of La Belle field, now at total depth of 10,332 ft. Side-wall cores were being taken. Humble 1 Hensley, 5 miles south of Lolita, a 9,000-ft. test, was at total depth of 6,014 ft. and had encountered gas odor. Hewitt & Daugherty 1 Traylor, 2 miles northeast of Texana, was in hard sandy shale at 3,755 ft. Akron Production Co. 1 Weardon, 3 miles north of Cordelle, was drilling in sandy shale at 3,498 ft.

Montgomery County.—Efforts were being made at Humble 1-B Texas Long Leaf Lumber Co., 1½ miles northwest of Splendora, to run a string of 9⅝-in. casing through the 10¾-in. pipe, which had collapsed in numerous places. This wildcat topped the Whitsett at 4,754 ft., McElroy 4,876 ft., Caddell 5,494 ft., Cockfield 5,750 ft., Discorbis Yeguaensis 5,935 ft., Eponides Yeguaensis 6,138 ft., Mt. Selman 6,510 ft.

Fort Bend County.—J. K. Dorrance et al had derrick up at 1 Pure Oil Co., in the Needville area.

TEXAS GULF COAST WILDCAT COMPLETIONS

Brazoria County: General Crude and L. A. Layne 1 B. H. Wisdom, A. Darst Sur., dry at 4,841 ft.

Fort Bend County: Christie Wildcat Co. 1 W. Strateman et al, 1½ mi. NW of Needville, dry at 6,354 ft.

Washington County: Champlin Refining Co. 1 C. D. Dallmeyer, 2 mi. N of Burton, junked at 7,566 ft.

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Drilling Contractors

Gilger Drilling Co., Houston, Tex., drilling at about 4,000 ft. at 1 Neill, Fort Bend County, Texas, for Grubb & Hawkins, had to shut down last week on account of high water. Gilger was drilling at 4,700 ft. on a wildcat for Grubb & Hawkins on the Tide Water prospect, near Leland, Miss., in Washington County.

Jack W. Frazier, Houston, Tex., has derrick completed for 1 E. H. Hooper, a 9,500-ft. wildcat test to be drilled for Weber Ogden et al, a mile northwest of Algoa, in Galveston County, Texas. A core test, 1 Mellie Esperson, which Frazier drilled for H. C. Cockburn 6 miles northeast of Houston, in Harris County, Texas, was finished dry at 4,553 ft.

Mac Drilling Co., Houston, Tex., started a rig up last week at 4 Cinco ranch, in the Clodine field, Fort Bend County, Texas, for Stanolind Oil & Gas Co., but had to halt work until high water subsided. Contractor was setting pipe at 3 Parker, in the Fred field, Tyler County, for Stanolind. Mac was at 7,500 ft. at 1 A. C. Woods, a wildcat 2½ miles northeast of Fresno, Fort Bend County, for Pure Oil Co. Contract depth is 8,000 ft.

Crescent Drilling Co. has been awarded contract on a wildcat Mid-Continent Petroleum Corp. will drill in Bienville Parish, Louisiana. The test is 1 J. R. Jordan, in C SE SW 30-16s-5w.

Brewster-Bartle Drilling Co., Houston, Tex., set surface pipe at 1,142 ft. last week at 1 S. D. Barnes, a 9,500-ft. wildcat test which it is drilling for Texas Co. a mile southeast of Fannett, Jefferson County, Texas. Contractor was drilling at 4,541 ft. at 1-A J. E. Pierce, a wildcat for Ohio Oil Co. 1½ miles northeast of Blessing, Matagorda County. It was completing 5 Braman, a producer in the North Markham field, Matagorda County, for Sun Oil Co. Brewster-Bartle was at 10,791 ft. at 1 Lutcher-Moore Lum-

Shell Oil Co., Inc., crew working on reverse circulator deepening Ellenburger well in K.M.A. pool, North Texas. The men are Ed Wilkins, Bruce Ferrell and C. Boyington, driller

ber Co., a Sohio Producing Co. wildcat test 1¾ miles west of Fields, Beauregard Parish, Louisiana. Contract depth is 12,000 ft.

S. B. Herring, Abilene, Tex., has completed a dry hole for Fain & McGaha et al at 1 E. A. Patterson, Section 20, Block 17, T.&P. Survey, outpost to the Patterson pool opener which he drilled in May. Rig has been moved to a northeast offset to the producer for 1-B Patterson, which will go to the Swastika sand if not productive in the Tannehill pay.

Wright Drilling Co., Houston, Tex., was rigging up last week on two contracts. For John B. Coffee it will drill 1 Kountz, a wildcat 2 miles east of the Mauritz field, in Wharton County, Texas. For Barnsdall Oil Co. it will drill 1 Schovajsa, in the Placedo field, Victoria County.

Lon H. Cron, Houston, Tex., will do a workover job for Continental Oil Co. at 33-A Driscoll, in the Driscoll field, Duval County. Upon its completion the rig will be moved to drill 21-B Driscoll, in the same field, for Continental. Cron is below 6,800 ft. at 1 J. S. Millenger, a wildcat which he is drilling for Continental 2½ miles northwest of Aldine, in Harris County.

Goldrus Drilling Co., Houston, Tex., has received from Lyons & Prentiss the contract to drill 1 A. Jank, 16 miles out of Yorktown, in Goliad County, Texas. Projected depth is 8,000 ft.

Work-Over, Inc., Houston, Tex., has started drilling four shallow sulfur tests in the Bully Camp area, Lafourche Parish, Louisiana, for Texas Gulf Sulphur Co. They are 7, 8, 9, and 10 Delta Securities Co. No. 7 is in 36-19s-21e. The others are in 1-10s-20e. Contract depth on each test is 2,500 ft., and all are being drilled from floating barges.

C. I. Drilling Corp., Houston, Tex., was below 7,200 ft. at Schlicher-Thomas Co. Bash-Johnson unit 1, which it is drilling for Gulf Refining Co. in the Pine Prairie field, Evangeline Parish, Louisiana. Contract depth is 8,300 ft.

Taubert & McKee, Fort Worth, Tex., have contract to drill a 7,300-ft. wildcat test in Tarrant County, near Keller, for Martin, Moore, and Brewster, and operations on the test are to begin immediately with rotary tools.

George Donnelly, Fort Worth, Tex., has contract to drill a 5,000-ft. Ellenburger test in Pecos County for Bryce McCandless. It will be 1 W. W. Turney, in the southeast corner, Section 19, Block 141, T.&St.L. Survey, southeast of the Apco-Warner Ellenburger pool.

Claude McQueen, Rushville, Mo., has been retained to drill Cities Service Oil Co. 2 Jim Cook, NE NW NW 32-65n-39w, an east offset to the company's sand discovery well in Atchison County, Missouri. Contractor is moving portable rotary rig to the location.

B. & T. Drilling Co., Falls City, Neb., has contracted to drill Stanolind Oil & Gas Co. 1 Laura Penney, 1-65n-31w, 4 miles southeast of Grant City in Worth County, Missouri.

Comanche Drilling Co., Blackwell, Okla., is more than two-thirds finished on a 3,000-ft. contract for C. L. Jenkins 1 C. R. Pickens, SE SE NE 20-34n-7e, Cowley County, Kansas. The contracting firm late last month completed a well for Paul R. Smith, Tulsa, on the Lena Snyder farm, SW NE 7-33s-4e, also in Cowley County.

Fain-Porter Drilling Co. and Atlantic Refining Co. are reported to have closed a deal for a Wilcox sand test in SW NE 11-10n-3e, on the southeast edge of Shawnee, in Pottawatomie County, Oklahoma.

Joe Trigg has contract for Phillips Petroleum Co. 1 Robe, NE NE NW 26-23n-5e, Pawnee County, Oklahoma. Location is some 4 miles east of Pawnee and the same distance north of the East Pawnee pool.

Leonard Drilling Co. and **Gordon Oil Co.** have contract to drill Rawmor Corp. 1 Howard Jones, in C SE SE 8-16n-7w, Mecosta County, Michigan.

H. M. McClure has been awarded contract to drill Southwest Development Co. 1 James Morren, in SE NW SE 2-5n-15w, Ottawa County, Michigan.

Stewart Godfrey has the contract for Rex Oil & Gas Co. 1 H. Johnson, in NE NE NE 26-1s-16w, Van Buren County, Michigan.

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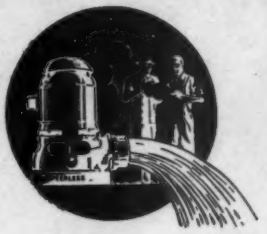
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PERSONALS

R. W. FRENCH

Oil Production and Drilling Replace Military Career

R. W. FRENCH, assistant manager of production and drilling for Continental Oil Co., was born at Colorado Springs, Colo. He attended grade and high schools at Long Beach, Calif., and was graduated from the University of Delaware, with a degree in mechanical engineering.

He was student engineer with the General Electric Co., Schenectady, N. Y., following graduation, leaving that position in 1930 to become a flying cadet with the Army Air Corps at March and Kelly fields, Texas. He was graduated at March Field in 1932 as a second lieutenant and was then assigned to the 73rd Pursuit Squadron at March Field spending 14 months on active duty.

Mr. French joined Continental Oil Co. in 1933 as a roustabout at Ventura, Calif., and held jobs as gang pusher, compressor operator, and petroleum engineer. He was named production engineer at Los Angeles in September 1942.

On May 1, 1943, he was appointed assistant manager of the production and drilling department, east of the Rocky Mountains, with headquarters at Ponca City, Okla.

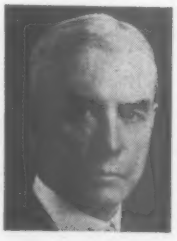
E. P. Dodge, works manager of Texas Co.'s refinery at Port Arthur, Tex., has been made assistant to the general manager of the company's refining department. His office will be in Port Arthur. He is succeeded as works manager by **F. L. Wallace,** formerly general superintendent at Port Arthur. **D. P. Bailey,** following a period of service with the PAW, will replace Mr. Wallace. Mr. Dodge, graduate of Pennsylvania State College, has been with Texas Co. since 1906. Mr. Wallace joined the company in 1919. Mr. Bailey, before accepting a PAW assignment, was in the company's foreign manufacturing department. He joined Texas Co. in 1927 as a chemical engineer.

Leroy C. Tucker, an employe of Rock Island Refining Co., at Duncan, Okla., for 13½ years, has been appointed secretary-treasurer of the company succeeding **Wilton Witt,** who resigned recently because of ill health and will make his home in South Texas.

Lee Pennington, formerly production foreman at Oklahoma City for Cities Service Oil Co., has been promoted to chief petty officer in the Seabees and is now stationed in New Guinea.

Troy Stalls, pipe-line scout in North Central Texas for Stanolind Crude Oil Purchasing Co., has been transferred to Midland, Tex., where he will be in charge of the company's office there.

Vilas P. Sheldon, for 9 years petroleum engineer for Stanolind Oil & Gas Co., at Fort Worth, Tex., has resigned and will move to Artesia, N. M., where he will be associated with Petroleum Engineers.



W. D. ANDERSON

William Downs Anderson, director, vice president and general manager of foreign sales for Atlantic Refining Co., retired early this month after serving the company since 1898. Mr. Anderson will be succeeded by **A. A. Garranbrant,** director and vice president who has been acting as assistant manager of foreign sales.

Robert N. Sears, assistant district director of the Refining Division of PAW for District 4, headquarters at Denver, Colo., has resigned to join the Navy in which he has received a commission as an ensign. Mr. Sears came to PAW from the Empire Refineries, at Spokane, Wash.

E. R. Turner, vice president of the Pan American companies, Houston, Tex., has been appointed chairman of the personnel and war activities division of the Office of Civilian Defense in that city. Mr. Turner, who is vice chairman of the budget committee of the Houston Community and War Chest, has been active in civic affairs for years. When an executive of Continental Oil Co. in Ponca City, before joining Pan American, he served as a member of the Oklahoma State Child Welfare Board and as a member of the governing board of the American Legion Home School.

Frank Pickell, formerly in the production department, Stanolind Oil & Gas Co., Tulsa, has been appointed manager of the industrial relations division which has been organized recently.

Virgil O. Harris, petroleum engineer for Humble Oil & Refining Co. in the Hawkins district, Wood County, Texas, has been transferred to the Talco district, Franklin and Titus counties, as farm boss. He is succeeded at Hawkins by **Jack M. Shepherd,** transferred from the Houston office. **James E. Barwick,** superintendent in the Magnet district, Wharton County, has been transferred to a similar post in the Maurbo district, Jackson County.

R. L. Denton, East Texas pipe-line scout for Magnolia Pipe Line Co., has been transferred to the West Texas area with headquarters at Midland, Tex.

H. C. Bretschneider, of Denver, has been appointed a member of the Colorado Gas Conservation Commission by Gov. John Vivian for the 6-year term. He resigned recently as state head of OPA and will return to his former office with the conservation commission.

Albert T. Jones, dispatcher at the Martinez, Calif., refinery of Shell Oil Co., Inc., has been promoted to oper-

ating supervisor of the gaging department.

H. W. Terry has been assigned duties of loading-rack foreman at Sohio Corp.'s terminal at Anding, Miss.

G. W. Gayle, formerly in the geophysics department of Humble Oil & Refining Co., at Houston, Tex., has been transferred to Midland to scout the West Texas district. He succeeds **A. B. McCollum,** who was transferred to the geological department of the company.

Wilbur V. D. Barnum, formerly employed by Texas Co. and Pan American Production Co., Houston, Tex., has graduated from the air forces officers candidate school at Miami Beach, Fla., and has been promoted to the rank of first lieutenant.

G. A. Miller has gone to Billings, Mont., where he will be in charge of a new office which has been opened by Shell Oil Co., Inc.

M. J. Rathbone, president of Standard Oil Co. of Louisiana, is a member of the four-man labor-management committee at Baton Rouge, La., studying a War Manpower Commission program for that Louisiana city concerning availability of employables, absenteeism and other questions.

C. H. Lutz, of the western Ontario staff of the Dominion Natural Gas Co., Buffalo, N. Y., has been retained by the New Brunswick provincial government to investigate and report upon the possibility of extending the present oil and gas-producing areas of the province.

John T. Dixon, stillman in Shell Oil Co., Inc.'s Wilmington refinery, has been promoted to assistant department manager at the same plant.

Charles Robinson, assistant department manager for Shell Oil Co., Inc., at the Wilmington refinery in California, has been promoted to department manager.

Harley H. Hale, formerly assistant department manager at Dominguez, Calif., Wilmington refinery, Shell Oil Co., Inc., has been promoted to department manager at the same refinery.

Robert E. Couch, Tulsa, formerly acting division petroleum engineer for Texas Co., has been promoted to acting district superintendent for Oklahoma in charge of drilling and producing operations. **Stewart P. Kent,** formerly district petroleum engineer at Salem, Ill., has been transferred to Tulsa and succeeds Mr. Couch in the engineering department. **C. C. Virgin,** lease man at Mattoon, Ill., is being transferred to Tulsa as assistant lease man and is succeeded by **Donald M. Rounds. Vernon C. Scott,** formerly district geologist at Mattoon is now acting geologist at Tulsa. **Jack Hirsch,** formerly in the Tulsa office, succeeds Mr. Scott at Mattoon.

J. H. Roos, who was a junior clerk for Stanolind Oil & Gas Co. in the Turtle Bay area of Chambers County, Texas, when he entered the Army Air Corps last October, has been commissioned a second lieutenant following a course at the finance officer candidate school at Duke University, North Carolina.

C. D. FAIRES

C. D. Faires, Charles R. Bickel and **Max A. Sherwood** are three Shell men now fully established in positions to which they were promoted in recent weeks. Mr. Faires was made chief engineer of the products pipe-line department with offices in New York. Mr. Bickel is division manager for Shell Oil Co.,

CHARLES R. BICKEL

M. A. SHERWOOD

Inc., at Centralia, Ill., and was formerly division manager at Wichita, Kans. Mr. Sherwood is assistant Oklahoma division manager at Tulsa and formerly served as Illinois production superintendent at Centralia, Ill.

Frank Dryden, Jr., who entered the air forces last September while employed in the land department of Gulf Oil Corp. in Tyler, Tex., received his pilot's silver wings and was commissioned a second lieutenant last week at Napier Field, Alabama.

F. H. McMahon, who was a scout for Humble Oil & Refining Co. in the Rio Grande Valley, Texas, working out of Corpus Christi, was inducted into the Army recently and has been assigned to Camp Claiborne, Louisiana.

Roy C. Jorgenson, who recently was promoted from first lieutenant to captain in the Signal Corps somewhere in the South Pacific, was employed by Shell Oil Co., Inc., for 5 years, being a roustabout in the Kilgore area, Gregg County, Texas, at the time he entered war service.

Staff Sgt. Edgar Q. Smith, employed in the geological department of Humble Oil & Refining Co., Houston, Tex., until he joined the flying training squadron at the Army air field in Pampa, Tex., in October 1942, has reported to the Army air forces officer candidate School in Miami Beach, Fla.

First Lt. Rolin E. Chambers, formerly in the geophysical-drafting department of Shell Oil Co., Inc., Houston, Tex., completed his primary flight training at Garner Field, Uvalde, Tex., and has reported to Goodfellow Field, San Angelo, Tex. Before entering the air forces Lieutenant Chambers was commanding officer of a quartermaster company at Duncan Field, San Antonio, Tex.

J. A. Lents, chairman of the District 4 marketing committee of the petroleum industries committees, has been appointed a member of a special committee of PIWC to suggest means of equalizing rationing of gasoline in Districts 1, 2 and 3.

Robert H. Tennant, geologist for Skelly Oil Co., Midland, Tex., for the past 6 months, has resigned his position and returned to his home in Portage, Wis., in anticipation of being called for Army service in the near future.

G. K. Fitch, who was marketing assistant for Texas Co. (China), Ltd., in Hong Kong, has been assigned to the Bureau of Economic Warfare in Kumming, China.

Lt. R. L. Gibson, formerly exploitation engineer for Shell Oil Co., Inc., at the Sheridan headquarters, in Colorado County, Texas, left for North Africa with an engineering unit, according to word received by Mrs. Gibson, in Houston, and presumably has been having a part in the exciting development in that war theater.

William Groundwater for many years director of transportation for Union Oil Co. has been appointed port agent for Los Angeles by the U. S. Maritime Commission and he has already taken over the new post.

Jack H. Sickler, geologist and independent producer, was reelected assistant secretary-treasurer of the Stanford Club at the annual meeting held last week at the University Club in Los Angeles, Calif.

Edward Gieck, independent California operator, has returned to Long Beach after a 90-day absence during which he completed two new wells in Illinois and expects to drill additional wells at Bridgeport later in the year.

Market Developments

East Coast

NEW YORK.—Agreement between OPA and PAW probably presages an early revocation of the ban on pleasure driving in District 1. Current statistics indicate the undesirability of this action. Removal of the ban is regarded as undesirable because of the inefficiency of rationing regulations without it. When the ban was removed earlier this year consumption of gasoline immediately soared with the result that it was necessary to reinstate it.

If similar results were to follow revocation of the ban this month the problem of meeting fuel-oil demands this winter would be intensified. Heating oil is reported to be very scarce in the Northeast in spite of the substantial increase in substitute methods of transportation. An increase in gasoline demands would prohibit emphasis on movement of heating oil, stocks of which must be expanded to meet winter requirements.

The index of available supplies for civilian consumption dropped slightly to 34.9 from 35.2 after seven consecutive advances. Little significance is attached to the decline since it was caused by the diversion of tank cars and will undoubtedly be rectified when the big-inch line is in capacity operation. Increased deliveries to the East Coast which will then be forthcoming are expected to be sufficient to prevent any serious fuel shortages this winter unless demands for gasoline rise so high as to prevent accumulation of fuel-oil inventories.

Gulf Coast

HOUSTON, Tex.—Shortages of products were aggravated on the Gulf Coast refinery market this week by interruption of normal refinery operations, resulting from hurricane damage to plant facilities.

The little stream of gasoline that was flowing out of this district for civilian use has become a trickle. For the time being virtually the entire yield is wanted for war purposes. Residual fuel oil and No. 2 heating oil have all but vanished. Scattered supplies of kerosene are obtained by persistent combing of the territory. Gradual improvement is to be expected as storm-battered refineries return to normal operation.

Although no official statements are available, it is reported that tanker shipments of oil products from Gulf ports have been increasing in recent weeks. Expanded movement by water has helped to ease the tank-car situation still further. Refiners and marketers say the shortage of tank cars —a serious problem a few weeks ago —has practically ended. Some large refiners are reported to have relinquished cars that had been allotted to them, making such cars available for other operators who require that type of transportation.

Mid-Continent

MOTOR-FUEL supply conditions in the Mid-Continent, previously tighter than most marketers had ever experienced, became more acute this week as individual consumers and dealers alike bought to the limit of their abilities. Purchasing was admittedly on an inflated scale. Consumers of all classes attempted to hedge against the imminent reduction in ration-coupon values.

Practically all marketers were methodically canvassing refiners, seeking to make spot purchases. Of course, the dwindling availability of crude oil with which to carry on current operations in the Mid-Continent area was another factor in keeping tension on the refinery market.

A.P.I. REFINERY REPORT

(Figures in thousands of barrels)
Week Ended July 31, 1943

	Dly. crude runs to stills	Stocks: Gasoline	Stocks: Residual	Stocks: Gas oil
Appalachian	130	2,133	531	1,063
Ind., Ill., Ky.	702	14,832	3,287	5,508
Okla., Kan., Mo.	320	5,995	1,719	2,041
Censored area*	1,789	31,020	13,962	15,365
Rockies	93	1,609	665	357
California	745	19,388	46,713	12,024
Total 7-31-43	3,788	74,977	66,877	36,363
Total 7-24-43	3,973	75,714	66,992	35,889
Total 8- 1-42	3,885	79,446	77,385	37,828

*Reports combined on East Coast, Texas Gulf, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
July 31, 1943	238,420,000
July 24, 1943	237,279,000
August 1, 1942	249,336,000

*Excludes unrefinable California stocks.

Agricultural areas continued to call for near-record volumes of motor fuel. Preferential position enjoyed by farmers channeled large percentages of available supplies into their hands.

Inquiries for fuel oils of all types increased and refiners anticipated general intensification of buying efforts on burning products. Activity has been well sustained throughout the summer in fuel oils, although refiners have been reluctant to ship more than minimum commitments under existing contracts. Railroads and heavy industry have been particularly active in acquisition of fuel oils and these two general groups appeared to be applying more pressure on suppliers with the approach of fall, linked this year with increases in manufacturing and transportation operations.

Crude oil is extremely tight. Refiners are competing vigorously for well connections and attempting to augment their normal supplies from whatever source available. Liquidation of aboveground stocks continues with critical shortages being relieved chiefly from inventories.

Pacific Coast

LOS ANGELES, Calif. — California marketers are seriously considering the advisability of discontinuing the sale of competitive-grade gasoline for the duration. Some have already discontinued sales of competitive-grade motor fuel for rebranding and others will follow. There has been a very definite trend toward premium gasolines. This trend has been evidenced for the past year and sales of premium gasoline have climbed accordingly.

Estimates vary as to how much gasoline is third-structure material but a check among some major and independent refiners indicates it is less than 10 per cent of the total.

The refining industry recognizes the possibility of a crude-oil shortage later in the year and operators are keeping their tanks fairly well filled.

Fuel oil has not been moving up to expectations as major marketers are willing to pay the posted ceiling and then, in addition, stand transportation costs. Consequently several independent refiners are sitting tight and maintaining stocks of gas oil and fuel oil. The last major sale was 30,000 bbl. of distillate at 5 cents per gallon which clearly reflects the present market. Gas oil is practically unobtainable except in very small lots.

Present indications point to the probability there may be a fuel-oil market of considerable extent later in the year when major refiners and marketers find their stocks being drastically reduced. Independent refiners hope to take advantage of fuel-oil inventories which they have been holding for higher prices.

Refinery Prices

(Prices as of August 10)

Quotations are f.o.b plant in cars and in cents per gallon except where otherwise noted. They are exclusive of the federal excise taxes of 1.5 cents a gallon on gasoline and 4.5 cents a gallon on lubricating oils, and do not include marine lighterage charges.

REFINERY GASOLINE

Octane (A.S.T.M.):	†80	74-76	72-74	68-70	63-66
Mid-Continent*	.....	.....	5.875-6.000	.....	5.500-5.625
Pennsylvania	.....	6.750-7.000	.....	.....	.....
Gulf Coast	6.00-6.50	.....	‡5.750-6.250	‡5.750-6.250	‡5.250-5.750
Northeast Coast	9.80	.....	9.2	9.2	.....
California	.....	.....	6.000-6.125	5.500-6.000	6.00-6.50

*Basis Group 3. †1939 C.F.R. (research method). ‡Unleaded.

KEROSENE AND NO. 1 FUEL OIL

Gravity:	46	45	42-44	41-43	38-40
Mid-Continent*	.....	.....	4.500	4.375	.....
North Louisiana	.....	.....	.....	4.500-4.750	.....
Pennsylvania	6.250-6.625	6.125-6.250	.....	.....	.....
California	.....	.....	.....	4.500-5.500	4.250
Northeast Coast	.....	.....	.....	6.80	.....
Gulf Coast	.....	.....	.....	4.125	.....

*Basis Oklahoma Group 3.

TRACTOR, DIESEL, AND BUNKER FUEL OIL

Specifications:	46-48° G.	24 D.I.	48-52 D.I.	58 & above	Diesel bunkers	Residual Bunker C‖
Mid-Continent*	4.125	.....	.....	.....	.....	$0.80-1.27
California	.....	2.750-4.000	.....	.....	‡1.35-1.45	0.85-1.00
Gulf Coast	.....	.....	4.000	4.125	1.45	0.85-1.27
Northeast Coast	.....	.....	.....	6.800	2.780	1.65-2.07
North Louisiana	.....	.....	.....	.....	.....	0.80-1.27

*Basis Oklahoma Group 3. †10-14° gravity. ‡Pacific Specification 200. ‖Gravity range.

FURNACE OIL, GAS OIL, FUEL OIL

	No. 2	No. 3	No. 5	No. 6
Mid Continent*	3.625-3.750	3.500-3.625	$0.85	$0.80
Pennsylvania (West)	5.875-6.125	5.875-6.000	†5.250-5.500	.....
Northeast Coast	6.7	6.7	1.95	1.65
California	5.5	5.5	‡1.10-1.25	‖1.10-1.15
Gulf Coast	3.875-4.0	.....	1.65	0.85

*Basis Oklahoma Group 3 †36-40 gravity fuel. ‡Pacific Specification 300. ‖Pacific Specification 400.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	3.875	4.650
North Texas	3.500	4.200
North Louisiana	3.625	4.350
California	4.875	5.500

LUBRICATING OILS

Bright and Steam Refined

OKLAHOMA (Group 3)—

200-210 D, 10-25		27.00
150-160 D, 0-10		23.00
120-125 D, 0-10		22.00
Steam refined:		
600 dark green (untreated)	9.00	9.50

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash)

10 pour point		30.50
15 pour point		29.50
25 pour point	25.00	28.00
Steam refined:		
600	15.00	16.00
650	15.50	16.50
600 flash	16.00	17.50
650 flash	17.00	17.50

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

0-10 pour point:	
200-3	15.00
300-3	18.00
500-3	19.50
600-3	20.00

Note: Viscous neutrals, 10-25 pour, quoted 0.5 cent under 0-10 oils.

Neutral Oils

CALIFORNIA—

Pale oils:		
200-2½-3	7.00	7.75
400-3-4	7.25	8.00
600-3-4	8.75	11.00
Red oils:		
200-4-5	7.00	7.75
400-5-6	9.00	11.00
500-900, 5-6½	9.25	11.25

GULF COAST—

Pale oils:		
200-3	8.50	8.75
300-3	9.00	9.25
500-3½	9.75	10.00
750-3½	10.00	10.25
2,000-4	10.50	10.75
3,000-4	12.25	12.50

PENNSYLVANIA—

150 vis. at 70° F., 3 color, 400-405 flash:

Zero pour point	37.50
10 pour point	36.50
15 pour point	35.50
25 pour point	30.00

200 vis. at 70° F., 3 color:

Zero pour point	39.50
10 pour point	38.50
15 pour point	37.50
25 pour point	33.00

WAX

(Cents per pound)

OKLAHOMA (Group 3)—	
124-126 (A.m.p.) w.c. scale	4.250
PENNSYLVANIA (Inland refineries)—	
122-124 (A.m.p.) w.c. scale	4.250
124-126 (A.m.p.) w.c. scale	4.250
NEW YORK—	
Wax in bags fully refined:	
130-132 (A.m.p.) wax	5.250
133-135 (A.m.p.) wax	6.150
Crude scale:	
124-126 (A.m.p.) w.s.	4.250
124-126 (A.m.p.) y.s.	4.250

TANK-WAGON PRICES IN 50 CITIES

(Gasoline prices based on regular grades tax included, undivided dealer)

ATLANTIC AND NEW ENGLAND

(Socony-Vacuum Oil Co., Inc., and Atlantic Refining Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Baltimore, Md.	15.96	5.50	10 50
Boston, Mass.	14.90	4.50	10 10
Burlington, Vt.	16.90	5.50	10 30
Buffalo, N. Y.	16.30	5.50	10 00
Dover, Del.	16.70	5.50	12 30
Hartford, Conn.	15.60	4.50	10 00
Manchester, N. H.	17.30	5.50	12 10
Newark, N. J.	15.30	4.50	10 00
New York, N. Y.	16.10	5.50	10 10
Philadelphia, Pa.	16.20	5.50	11 05
Pittsburgh, Pa.	16.70	5.50	12 30
Portland, Me.	16.30	5.50	10 30
Providence, R. I.	15.00	4.50	9 90
Washington, D. C.	15.20	4.50	11 30
Average 14 cities	16.03	5.14	10 83

(All prices undivided dealer basis.)

CENTRAL

(Standard Oil Co. of Indiana, Standard Oil Co. of Ohio, Continental Oil Co. and Texas Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Chicago, Ill.	13.40	4.50	10 30
Cleveland, Ohio	15.00	5.50	*9 00
Dallas, Tex.	13.00	5.50	7 00
Des Moines, Iowa	14.40	4.50	9 00
Detroit, Mich.	14.40	4.50	9 00
Fargo, N. D.	16.90	5.50	11 30
Huron, S. D.	16.30	5.50	10 70
Indianapolis, Ind.	15.20	5.50	9 00
Little Rock, Ark.	17.50	6.00	10 00
Milwaukee, Wis.	16.10	5.50	10 50
Minneapolis, Minn.	15.40	5.50	10 30
Omaha, Neb.	15.40	6.50	9 00
Tulsa, Okla.	16.50	7.00	8 50
Wichita, Kans.	13.70	4.50	8.00
Average 14 cities	15.15	5.57	9 61

*Includes 1-cent state tax.

SOUTHEASTERN

(Standard Oil Companies of New Jersey, Kentucky, and Louisiana)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Atlanta, Ga.	18.90	7.50	*11 00
Birmingham, Ala.	18.50	8.50	9 00
Charleston, S. C.	18.95	7.50	....
Charleston, W. Va.	19.25	6.50	13 30
Charlotte, N. C.	20.10	7.50	11 30
Jacksonville, Fla.	18.90	8.50	9 50
Jackson, Miss.	17.50	7.50	†9 00
Louisville, Ky.	16.50	6.50	8 50
Memphis, Tenn.	17.90	8.50	10 50
New Orleans, La.	17.75	8.50	*10 00
Norfolk, Va.	17.45	6.50	12.30
Average 11 cities	18.34	7.50	10 49

*Includes 1-cent state tax.
†Includes ½-cent state tax.

MIDWESTERN

(Continental Oil Co.)

	Dealer tank wagon	Combined tax	Kero tank wag.
Albuquerque, N. M.	17.50	7.50	10 00
Boise, Idaho	20.10	6.50	16 50
Casper, Wyo.	17.00	5.50	12 00
Denver, Colo.	14.50	5.50	11 00
Helena, Mont.	17.00	6.50	13 00
Phoenix, Ariz.	18.50	6.50	12 50
Reno, Nev.	17.50	5.50	13 50
Salt Lake, Utah	18.50	6.50	14.80
Average 8 cities	17.58	6.25	12 88

PACIFIC COAST

(Standard Oil Co. of California)

	Dealer tank wagon	Combined tax	Kero. tank wag.
Portland, Ore.	17.00	6.50	13 80
San Francisco, Calif.	14.50	4.50	11 50
Seattle, Wash.	17.00	6.50	13.80
Average 3 cities	16.17	5.83	13 03
Average 50 cities	16.55	5.96	10 67

Safety in light oil treating plants . . .

Information supplied by "The Oil and Gas Journal"

The greatest hazard in light oil units is the volatility of the product. Safety measures comprise preventing the escape of inflammable gases, and detecting their presence. Some of the important routine safety procedures are:

1. Check pump and other packing glands on a frequent, set schedule. Repack any showing signs of leakage.
2. Place sight-gauges in protected locations, guard glasses with bars, heavy screens or movable shields. Install check valves in large glass connections.
3. Install automatic shutoffs on pumps handling gasolene where overflow is possible.
4. Install check valves on all lines where pump or line stoppage might permit backflow or overflow.
5. Inspect all lines carrying corrosive chemicals or gasolene-chemical mixtures regularly, under pressure.
6. Consider every pool or spot of liquid to be a corrosive chemical or a source of inflammable vapors to be removed or soaked up with sand or soil.
7. Test connections, enclosed spaces, etc. regularly for hydrocarbon vapors with approved testing equipment.
8. Force hydrocarbon vapors entirely out of tanks, and test with approved appliances before permitting personnel to enter, regardless of delay.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

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MOLY

Equipment Progress

General Electric Announces New Motors

A new line of vertical high-speed, hollow-shaft synchronous motors has been announced by the Motor Division of General Electric Co. Furnished in ratings from 100 to 1,000 hp., and in speeds from 514 to 1,800 r.p.m., these motors are especially desirable for pumping applications where a large volume of fluid is handled, such as in ordnance and synthetic-rubber plants, and on municipal and government water projects.

For protection, these motors have a dripproof enclosure. They are streamlined throughout to provide a pleasing appearance, and their smoothly contoured lines will not easily collect dirt and dust. The top cover of the motor is easily removed to permit adjustment of the pump shaft. In addition, easy access to the brushes and the collector rings is obtained by simply unlatching a flush-mounted steel plate.

The frames of these motors are of cast-iron construction, which provides strength to withstand the high-thrust loads often encountered in pump applications.

The motors can be furnished with nonreverse ratchets to prevent reversal of pump rotation at shutdown or on starting. They are also available in solid-shaft construction.

A. P. Green Co. Gets Gold Star for "M" Pennant

A gold star symbolic of continued achievement in the production of refractory material vital to the U. S. Maritime Commission's victory fleet was added on A. P. Green Co.'s 'M" pennant at a special ceremony June 25, at the company plant in Mexico, Mo. The gold star was sewed on the pennant by Miss Frances Henry, the first woman to be employed in the plant.

In order to avoid any slowdown in production, each department of the A. P. Green Co. was represented by two workers who were presented with large scrolls denoting the production award.

Awarding the Army-Navy "E" to American Well & Prospecting Co., Corsicana, Tex. The company makes armor-piercing bombs. In the picture, left to right: Col. Merle H. Davis, district chief, St. Louis ordnance district; Col. R. W. Coward, executive officer; R. D. Campbell, suboffice; J. E. Rittersbacher, president of American Well & Prospecting Co.; Lt. Comdr. Roy J. Miller, U.S.N.; F. A. Westphal, inspector of Navy material; Rear Adm. P. W. Foote, U.S.N. (retired), inspector of Navy material. Insert—Edgar Rittersbacher, vice president and treasurer of American Well & Prospecting Co.

Wheatley Enters Second Quarter Century of Business

The recent change in the name of a pioneer oil-country firm to Frank Wheatley Pump & Valve Manufacturers, at Tulsa, recalls that 27 years ago, two brothers, Tom and Frank Wheatley, opened a small repair shop in the back end of a garage in Kansas City, Mo. From this obscure be-

F. WHEATLEY, SR.

F. WHEATLEY, JR.

ginning, a quarter century ago, has developed Wheatley Brothers Pump & Valve Manufacturers. The story of the creation and growth of this company is a true saga in the annals of American free enterprise and progress.

From an original capital investment of practically nothing, the firm has developed into a large, modern manufacturing plant, making a complete line of pipe-line supplies in addition to important war equipment for the U. S. Army and Navy.

The young company developed and expanded manufacturing facilities rapidly. By 1926, the company had become known in the Mid-Continent oil country for its ability to make or repair any pipe-line equipment. Wheatley Brothers established a plant in Tulsa, and Tom Wheatley moved to Tulsa to take charge of the new operations.

Frank Wheatley, president of the firm, remained in Kansas City until 1934 at which time he purchased his brother's interest, assumed responsibility for the operation of both plants, and changed the corporate name to Wheatley Brothers Pump & Valve Manufacturers. Tom Wheatley moved to Houston, Tex., and organized a supply company to handle Wheatley products. The Kansas City plant was closed in 1936 in a move to centralize all operations in Tulsa.

In 1939, Charles Wheatley joined the firm as vice president in charge of sales and brought with him a background of 20 years in the field of selling.

Frank Wheatley, Sr., will remain as president of the company and his son, Frank Wheatley, Jr., has assumed the position of vice president and general manager and is one of the youngest executives in the equipment manufacturing industry. He is well qualified for the growing responsibilities of his position, both from his family background and from 5 years'

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Journalisms:

AN idea widely used in aircraft manufacture holds a promise for postwar adoption by the oil industry. This idea is a fast, economical and accurate method of making templates by photographic processes. Time was when templates of all kinds were drafted by hand, required long hours over a drafting board. This was much too slow for mass production of aircraft, where, in the making of a new type or model, more than 20,000 metal templates are often needed. Templates that formerly took several weeks to lay out can now be photographically reproduced in a matter of minutes. Scheduled for an early issue of the Journal is an article which describes this process, and how it can be adapted to the fabrication of certain types of equipment made in the shops of the oil industry and its suppliers. Pictures will largely tell the story, pictures especially taken for the Journal in one of the nation's large aircraft factories.

WHAT can be done with the petroleum industry's tremendous production of 100-octane and other high-octane motor fuels which, if the war lasts another year, will total several hundred thousand barrels daily? Refiners and distributors are more concerned about this postwar problem than any other single development of the war-emergency period. One of the industry's largest research organizations has devoted considerable time to an analysis of the factors involved in this situation which will be brought home to the industry as soon as peace arrives. A discussion by the technologists of this organization will be a feature in the August 19 issue.

MOST all production problems in western Kansas fields are directly attributable to lifting and handling relatively large volumes of water. For this reason, operators in these fields are giving increasing consideration to adoption of measures that will retard encroachment of water and minimize the volume of water that must be handled. Particular importance is being attached to the potentialities of reduced fluid withdrawals as a means of curtailing water production. The work that has been done along this line will be discussed by a staff writer next week.

CALENDAR

August

S.A.E. WEST COAST TRANSPORTATION AND MAINTENANCE SECTION, Palace Hotel, San Francisco, Calif., August 19 and 20.

September

AMERICAN CHEMICAL SOCIETY, petroleum division, fall meeting, September 6-10. Place not yet determined.

NATIONAL PETROLEUM ASSOCIATION, annual meeting, Waldorf-Astoria Hotel, New York City, September 21-22.

October

AMERICAN ASSOCIATION OF OILWELL DRILLING CONTRACTORS, third annual meeting, Houston, Tex., October 5-6.

AMERICAN GAS ASSOCIATION, twenty-fifth annual meeting, Jefferson Hotel, St. Louis, Mo., October 11-13.

MID-CONTINENT OIL AND GAS ASSOCIATION, annual meeting, Blackstone Hotel, Fort Worth, Tex., October 14-15.

INDEPENDENT PETROLEUM ASSOCIATION OF AMERICA annual meeting, Fort Worth, Tex., October 25-27.

November

AMERICAN PETROLEUM INSTITUTE, twenty-fourth annual meeting, Palmer House, Chicago, Ill., November 8-11.